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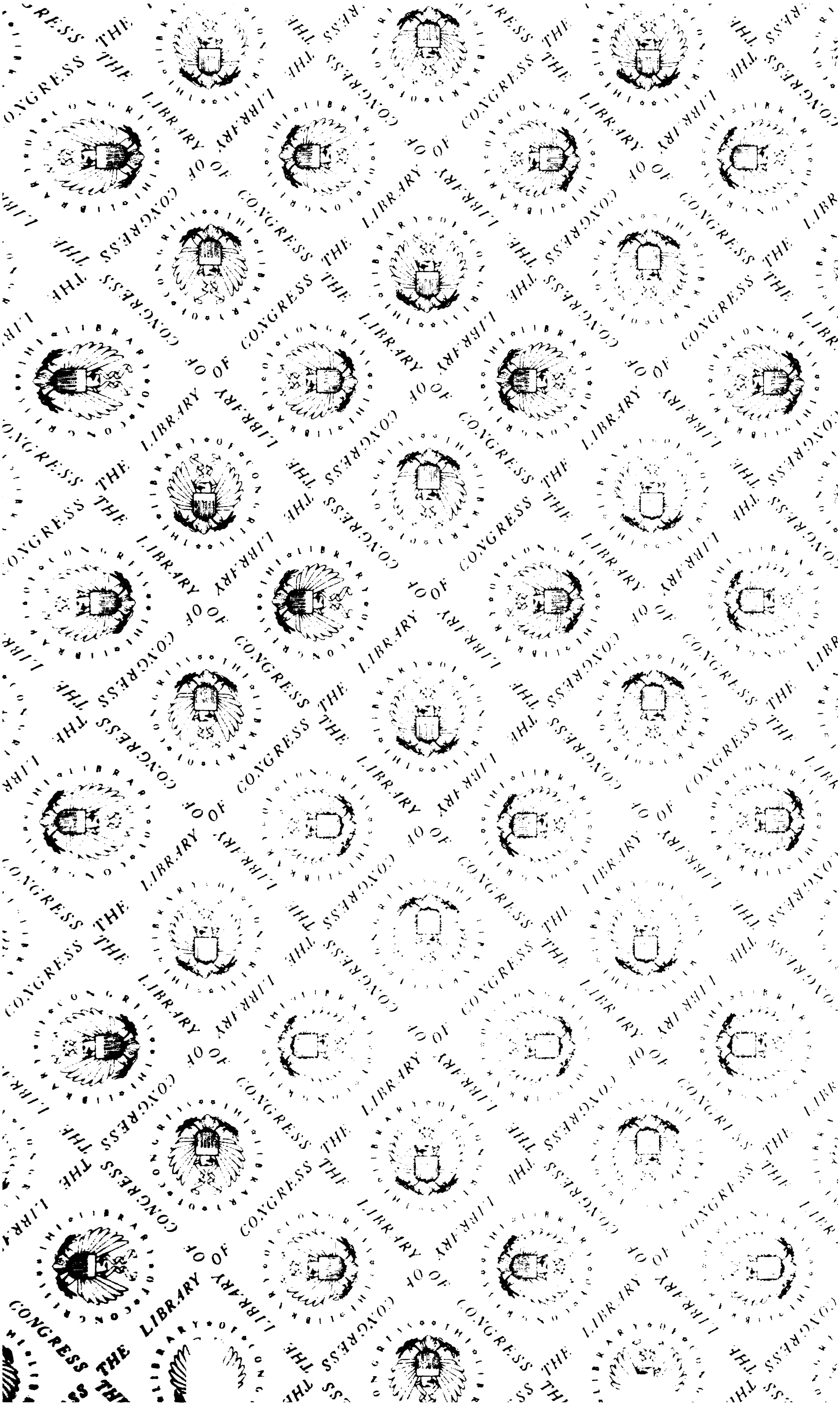
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THE

COUNTRY GENTLEMAN'S MAGAZINE

JULY 1869

ON IMPROVING THE CLIMATE OF GREAT BRITAIN BY THE PLANTING OF TREES.

BY WILLIAM BROWN, FACTOR, INVERCAULD.

I HAVE yet to learn that any government or scientific body has ever taken up in a right way those points in the scientific culture of trees, the elucidation of which is so much wanted to guide and assist landed proprietors and practical foresters; or those influences, good or bad, which trees are found to possess over the soil and climate, and hence over the health of other vegetation, as well as that of animals.

To the superficial observer there has not perhaps been occasion for any particular notice of a science which many consider as merely a branch of agriculture, and who probably see no cause to give arboriculture an independent standing. I wish then to remove this objection, and to claim for arboriculture that position which I hope to shew its importance eminently deserves, and urgently demands.

What is Arboriculture? To the practical forester it is the production of the best timber at the least cost, in the largest quantity and shortest time. To plant, thin, and clear, for profit, is almost his sole object. The value of woods is yet estimated very much by the amount of their own produce. Such a view of them reminds me of a proprietor who holds ordinary stock in a railway through his lands, and who expects good dividends besides the many indirect advantages of the increased communication. One so circumstanced would be selfish and unreasonable did he expect five per cent. for his money; and so, those who are dissatisfied with 20s. or 25s. per acre per annum (on averages of soil and kinds of trees) from their wood crops, without reference to climate and health, are equally selfish and unreasonable. I purpose then to shew the value of trees in connexion with climate and health.

A tree, with its branches and leaves, is a bunch of inhaling and exhaling organisms. Evaporation and inhalation go on from the thin leaves, as they are heated by the sun's rays, or cooled at night, in the same manner as other bodies. Buchan says that trees may be conceived as reservoirs in which the heat of the day is stored up against the cold of the night.

"The effect then of trees on the temperature is to make the nights warmer and the days cooler; and from this it follows that they diminish the summer temperature and maintain that of winter higher than it would otherwise be. This enables us to understand how trees increase the rainfall; for suppose a forest to lower the summer heat of a district to the extent of about 2°, the effect on t rain-bringing winds would be much the same as if a low range of hills opposed their course, and condensed their vapour into rain."

The influences of trees are ascertained in two ways, viz.: in the diminished radiation from the surface protected by trees, and in the obstacles they oppose to the descending currents of cold air. Humboldt says that trees "exhale fluid from their leaves, in the first place, for their own benefit. But various important secondary effects follow from this process. One of them is, maintaining a suitable portion of humidity in the air. Not only do they attract and condense the moisture suspended in the air, and borne by the wind over the earth's surface, which, falling from their leaves, keeps the ground below moist and cool, but they can, by means of their roots, pump it up from a very considerable depth, and, raising it into the atmosphere, diffuse it over the face of the country. Trees, by the perspiration from their leaves, surround themselves with an atmosphere constantly cool and moist. They also shelter the soil from the direct action of the sun, and thus prevent evaporation of the water furnished by rains."

Such, briefly, are the breathing or perspiring effects of trees upon the atmosphere. There is no want of proof of these effects, and I shall give a few examples. At the Cape of Good Hope, Sir John Herschel observed on the side of Table Mountain, from which the wind blew, the clouds spread out, and descend very low, frequently without any rain falling, while on the opposite side they covered the mountain in dense masses of vapour. When walking beneath tall fir-trees at the time those clouds were closely overlaid, he was subjected to a heavy shower of rain, but on going out from beneath the trees, the rain ceased. The explanation he gave of the phenomenon was, that the clouds were condensed into rain on the cool tops of the trees. This is a remarkable illustration of the influence of trees in condensing the vapour of the atmosphere.

The influence of woods upon springs of water is also remarkable. As an instance, Boussingault relates that the Wolf-spring, in
the Commune of Conbay, did not exist a
years ago. At the place where it now ri
a small thread of water was observed a
very long rains, but the stream disappea
with the rain. This spot is in the middle
a very steep pasture, inclining to the so
Eighty years ago, the owner of the land,
ceiving that some firs were shooting up in
upper part of it, determined to let them gr
and they soon formed a flourishing gr
As soon as they were well grown, a
spring appeared in place of the occasio
rill, and furnished abundant water in
longest drought. For forty or fifty years
spring was considered the best in Clos-
Doulis. A few years ago this grove
felled, and the ground again turned to
ture. The spring disappeared with
wood, and is now as dry as it was nin
years ago.

Again, the present sterility of the o
fertile, but now deserted and desolate reg
of Syria, Barbary, and Chaldea, are fami
instances of forest-clearing. Similar res
are being brought about by clearing
Canada.

In early times, when Britain was a cou
of forests, the seasons were more marked
regular than now, under drainage and c
vation.

Most calamitous effects could be instan
especially in foreign countries, from the r
less sweeping away of forests, whereby
structive inundations are frequent, and
country around has become a waste. T
can be no doubt that the want of a due
portion of a country under a tree crop is
tain to cause irregularity of temperat
violent storms, and dryness.

On the other hand, a country may be o
clothed with wood, so as to bring about
the opposite effects, which, besides t
more immediate results, are well kn
as generators of disease. Indeed, the his
of all nations reveals the effects of cut
down their woods and forests, and it i
daily one. In reviewing a French work
May last, the *Pall Mall Gazette* has
following:—

"In travelling through Spain and

centre of France, there is nothing sadder than to draw a contrast in the imagination between the present treeless tracts and the vast forests which once covered the land. In Spain, miles and miles of tawny monotonous country go by for hours, as you sit in the railway carriage, telling of baking suns and freezing winds, dangerous floods, sudden and violent changes, destructive to human life.

"The great question of replanting forests is now very much considered in Europe; and it is a most important question. Not only does the vast quantity of wood which is consumed in modern civilised life make it so, the question also involves climate and health. Those great inundations which cause such terrible suffering in France would be much mitigated, if not prevented altogether, if the hills and valleys were covered with forests. The seasons themselves would be less intense—the summers less burning, and the winters less freezing. To those who know the north coast of Africa, it is clear that there is nothing more likely to rouse genuine enthusiasm than the prospect of clothing the hills with vegetation, and thus mitigating the terrible effects of sirocco, rendering that beautiful country more healthy in the plains, giving it the shade which it requires, absolutely producing rainfalls, and increasing the supply of water from the springs; in one word, changing the meteorological phenomena, and adapting it for men and civilization. Dr Bodichon insists that Africa has a deteriorating effect upon men, principally owing to the irritating effects of the dry air and of the sirocco. And he, moreover, adds in his book that there the ground has done its part, and that the tree must now begin its work."

"Ever since the axe of the European planter vigorously began work on the forest ranges of Western India, alarm has been felt (says the *Madras Times*) for the regular supply of water to the plains. Government have from time to time attempted to investigate the subject, but how to prevent the mischief done by floods at one time of the year, and drought at another, is a matter which they still much wish to discover. It is now well ascertained that the extensi felling of the forests causes this double m chief; and Dr Cleghorn, the officiati inspector of forests, who has recently t velled along the mountain ranges northwa from Cape Comorin, points out that the simpl and most practicable method of diminishi if not preventing these evils, is to replant t bare hillsides. Mr Markham, secretary the Royal Geographical Society, calculat recently that in Western India a total area 180,000 acres of forest has been cleared coffee, tea, and cinchona plantations."

Let us now take this matter home to o selves, and see how Britain stands in rega to trees and climate.

The area of Great Britain is ab 57,000,000 acres, of which it is estimat 2,600,000, or 1-22d part, are under a crop wood of all kinds and ages; or, more parti larly, the whole surface may be divided i five grand divisions, thus:—

	Acres.
Corn crops	7,300,000
Green crops	3,500,000
Grass	15,800,000
Wood	2,600,000
Uncultivated	25,800,000
	57,000,000

There is, then, in our island, 1 acre every 22 covered by trees, or only one-thi less than what is under green crops. every 11 acres of cultivated land there is of wood, and 1 to every 16 of uncultivate The grass land rental of Great Britain bei about £53,000,000, or 18s. 6d. per acre ov head, but 30s. when confined to the cu vated; and as a wood crop is found return as much, on an average, as arable, find the annual value thereof to be no l than £2,500,000—a financial fact to tell favour of the object of this paper.

We find, then, there are at present tr enough to make a belt two miles broad round the coast. This seems large, and regularly distributed, according to the requi ments of districts, it might be found that acre in 22 is sufficient, not only for hea and shelter, but also for climatic uses.

Sir Henry James, the head of the Ordnance Survey, estimates that 2½ per cent. is the proportion of wood surface over England, which, with the exception of Portugal, is probably below that of any other country. Of course, the larger the body of land the greater amount of wood is required.

Germany, for instance, requires 20 per cent. for agricultural purposes. France has 17 per cent. under wood, which is found to be too little.

And now for our argument on the whole question.

The practical observer and the man of science agree in the belief that man, to a great extent, can control and regulate certain climatic agencies. In regard to the extent to which this may be done, difference of opinion doubtless exists; but few whose opinion can be of much weight will doubt the fact itself. The attestation of this is strongly maintained by Sir John Herschell.

"There is evidently," he says, "something distinct from mere local situation which determines this element of climate, and one must look for it in the nature of the surface of the district, and its relations to heat and moisture, relations which the operations of man on the soil itself, and his selection of the kind of vegetation with which it shall be habitually clothed, place to a great extent within his power. It is chiefly in his clearance and allowance of arborescent vegetation, and in his artificial drainage of the soil that his influence on these relations is perceptible."

I am glad that ideas which I had myself formed by observation should be borne out by this eminent authority.

In the same chapter, Sir John says, "that drainage, if carried to excess, may ere long be very severely felt in rendering large tracts of country uninhabitable in summer for mere want of water."

This remark has particular reference to a paper by Mr Symons, "On the Rainfall of the British Isles," prepared for the British Association in 1865, where the important fact is brought out that the annual mean rainfall is decreasing, on an average, over the whole country to the extent of abou 4 per cent. This more especially occur along a line running S.W. and N.E. from Cornwall to the Wash, and is attribute partly to the universal clearance of timber and partly to the robbing of the springs b artificial drainage.

To prevent any ill-grounded view of a agricultural improvement so important as tha of under-drainage, I beg to say that I much doubt if the drainage should be blamed fo even a part of the evil in this case; for, t my view, the unusual clearance of timbe should be saddled with the whole of the ba consequences. The most extensive drainag will do no harm anywhere, where there is, a there ought to be, for other purposes beside this, a proper distribution of trees. In orde to realize the full benefits of extensive drainage it is necessary that the country, or distric of country where it is carried on, should b protected by a requisite extent of woode surface.

How important then to the success of farming alone is the subject which we are now discussing. Indeed it may be said that arboriculture must *precede* ere agriculture can *succeed*

But I pass to another aspect of the question.

Narrow as Britain is, its climate is materially influenced by local causes. Why is it that there is a great local diversity in the quantity of rainfall in places whose general similarity of situation, as regards wind-exposure and surface configuration, would seem to preclude any material difference on an average of years? We find there is something distinct from mere local situation which determines this element of climate; and we have evidence, often painful evidence, indeed, that the cause lies solely in the character and nature of the surface of the district, in respect particularly to the area of surface occupied by trees.

It is of course obvious that the division of a country by mountainous ranges constitutes an individual local climate with respect to heat, moisture, and frequency of winds and storms; yet one of the ruling causes even in such instances is vegetation.

If those southern counties of England now being damaged for want of water, had been drained before the timber clearance, no bad effects would have at the time occurred, and as soon as they are again replanted, the bad effects will, I doubt not, disappear.

It is sometimes said, "give me a good soil and I will produce abundant crops," but this sole condition as to quality of soil is not enough, for a favourable climate is even more important than a rich soil. It is a fact that, as regards the primitive soil, there is no difference betwixt the slopes of the Himalayas where the deodar and the broad-leaved oak (Quercus latifolia) luxuriate, and a great part of Scotland, the soil in each case being principally from granite and mica-schist. The difference of climate must be the principal cause of the difference of crop in this case. The succession of pine to oak, or beech to pine, in indigenous forests, has no doubt depended more on changes of temperature than any other physical cause. It is quite clear that different localities require different quantities of rain, according to the nature of the exposure, altitude, and geological formation, and that the geographical distribution of rain cannot meet the requirements of all parts of a country. Hence the need of those modifying circumstances which man can command being brought into play; for while it is beyond his power to interfere with the periodicity of events, to modify them certainly is not.

I remark, also, that periodical storms, originating at a distance, are not the governors of one regular rainfall. Rainfall, as I have already remarked, is mostly regulated by local influences. This is exemplified in the results brought out by Mr Symons. As regards our southern counties, the great clearing of timber, aggravated by drainage operations, caused such a local deficiency as was felt a long way northwards, while the belt of copious rainfall from the centre of Ireland to Edinburgh, possessing well wooded districts and being little interfered with by man, shews an exactly opposite effect. In either of these cases, had the rain come from a distance, its distribution would have more general and equal.

And now mark what follows. Mr Sym acknowledges that rainfall records evinc regularity not before expected. Even l irregularities, large as they are, are neutrali by the combination of the whole. In sh his valuable paper goes to shew that for last fifty years the amount of rainfall taking one year with another, been ne identical with the mean.

I repeat, that the observations of hal century make it clear that the rainfall of th isles is, for all practical and general purpo a regular one ; that great extremes, which rare, may be due mostly to causes outs ourselves, and that ordinary irregularities governed by causes within ourselves. I with these irregularities that the scient arboriculturist has to deal.

The relative proportions of woodl formerly given do not apply as a whole, being properly distributed. We want a m regular distribution, and until this is done is perfectly plain we will never secure ad table climates; and until we employ the me in our power to bring about as much regula or steadiness in our climate as possible will be difficult, if not impossible to m meteorology practically useful.

It would be curious and instructive trace out in detail the changes which wo result from a more equable temperature— result of our attentions to Arboriculture a science. In reference to trees themsel the present varieties of quality in the sa species, even in this country, is due in a gr measure to a genial or ungenial summ and the evidence of this is strikin shewn in their concentric growths. Ve table life differs in no respect from animal its limit of duration as influenced by favo able or unfavourable circumstances— having an even flow on the one hand, or s den extremes of heat and cold on the oth Just as a man will live a less healthy an shorter life who courts extremes of clima or other habits, so will a plant pre-matu and this being the case, we know that an equally growthed tree is not so durable in quality and does not produce the like quantity of timber as one does under more equable and temperate circumstances.

A tyro in botany can explain why a rapidly-grown tree is stronger than one of slow growth; but while the one gives strength the other gives durability, and our aim should be their combination.

But I think it may be safely said, that we are now in possession of sufficient material from which clear and precise inferences may be deduced. I come to this conclusion, from perusing the voluminous records of careful observations over the whole land, and am arrested by this plain and pointed question:—With the knowledge of these two facts, the general *regularity* of rainfall, and that *local irregularities* are governed mainly by *local influences*, are we still to carry on the same plan of observing, recording, and deducing? Is it not time to amend our course of procedure in relation to atmospheric science? We are in possession of such soundings as will enable us to steer with some measure of safety, but what the further course of the voyage should be exactly, I am not at present prepared to say. Its object, in the first place, should probably be to establish a set of direct experiments to test the deductions which we have drawn from the general ones. The question which I wish to set before arboriculturists and meteorologists is this:—At certain geographical positions, exposures, altitudes, and on certain geological formations, with and without artificial drainage, to what extent and in what way do trees, and other vegetation, exert their influences? Properly conducted experiments, bearing on these and like points, would doubtless lead to important results, and would at once lay the foundation for a new era in the history of our rural economy.

So far as I know, the only paper bearing directly on this subject was by the committee appointed by the British Association in 1851, to consider "The probable effects, in an economical and physical point of view, of the destruction of tropical forests." They admit that there is a deficiency of exact or experimental information on the subject, that is, on the physical effects of the removal of forests, and that "observations of a precise character on climate in countries once covered by forests, but now cleared, do not exist." Indeed, the whole question given them was a probable one. The report of this committee (ably superintended by Dr Cleghorn, India), contains, however, several very valuable remarks, and, at the same time, some questionable ones. For example, on the question between the maintenance and removal of forests, they say that "whenever the progress of population requires that every portion of the soil be made to yield its quota of human food, there the destruction of forests is to be desired." Now, it being admitted that tree influences are immediately local, I much question if even a sort of isolated planting would do—such as on distant hillsides, leaving the lower lying and more valuable lands clear of wood.

In a letter from Dr Wight to Dr Cleghorn, 1851, it is well observed:—"As to the destruction of forests it appears to me that there can be but one opinion on the subject, and that is, that it is most injurious to the welfare of any country, and ought upon no account to be tolerated, except where the ground they occupied can be turned to better account, and even then entire denudation should be avoided."

The author of that interesting work "Sunshine and Showers," sums up a chapter on "the influence of trees on climate" thus:—"It is a question demanding immediate inquiry, in order that the truth of the matter may be known before the owners of estates shall have permanently injured their own interests, the general interests of the island and its population, before Government shall have lost any opportunity of interference." He also says that a vast deal has been said and written on the influence of trees, without elucidating the subject by reasoning founded on clear and precise experience; and, therefore, we must be thankful to any one who can furnish us with such downright facts as may enable us to draw our own conclusions. Let the Scottish Arboricultural

Society take this hint, and set to work at once.

Now-a-days, if a party creates what is called a nuisance—affecting the health of others or that of his crops, the law provides a remedy, but in this more important matter, where a quarter of a century or more must elapse before an over-clearance of wood can be remedied, no immediate action can be taken. Let us take warning from the dear-bought experience of other nations. But it is not only an individual nation's interest. The undue clearing, or preservation, of the forests of one country concerns that of another, as, being directly connected with the production of rain, any disturbance in the one must affect the other. Climate concerns the whole community, and its prohibition from injury is one of the duties of Government. There are especial laws in France and Germany against the overclearing of forests, and compulsory directions as to replanting. Why, then, the indifference in this country?

We are asked by some if we cannot "take a hint from *nature*, and make amends for having interfered with her provisions. We are told to plant *oaks* on the hill tops, and every locality unfit for other cultivation." This advice will not do, I fear. I would take a hint from nature, but not fall back upon her methods altogether, for is she not the parent of marshes, bogs, and in many cases of extremes of temperature and of noxious gaseous admixtures, which produce fevers and other diseases? We must respect mother nature, but may not follow her in all things.

Plant *oaks* on the hill tops! where, in the majority of cases, neither soil nor climate is suitable. Any other locality *unfit* for other cultivation will not bear broad-leaved trees in the first instance. This proposed remedy for the future is a little hurried. When the day comes that oak will thrive on hill tops, and in any locality unfit for other cultivation, we may congratulate ourselves on arboricultural science and practice, or look for some extraordinary revolutions in the economy of nature.

I repeat that, upon the grounds of the foregoing facts, it is evident that a climate may
made, or at least regulated by man, to
different crops and districts. As a cer
body of trees does influence, one way
another, the climate of its neighbourhoo
really results that, by a proper distributio
variously sized plantations, man may co
to suit, in degree, the climate to the pl
and not so much the plant to the climate
he must do in present circumstances.

As illustrative of the effects of trees on
health of the population, I would refer
the districts of Grantown and Abernet
in Strathspey, which, before 1856, w
covered with some 15,000 acres of ne
continuously close masses of plantation
natural forest. After 1856, and to this d
a regular system of thinnings and cleari
has taken place. The population of th
districts in 1861 was 5871, and the ext
embraced is some 90,000 acres, thus shew
one acre of wood to every six of other cr
or waste land, being double the average
the kingdom.

The Registration Act not having come i
operation previous to 1855, prevents the po
bility of getting reliable information as to
per centage of deaths when the country
under a close mass of wood; but as from t
date to 1861 is sufficient to allow for
change of climate brought about by the th
ning and clearing, we can ascertain in w
way it has become perceptible. The foll
ing table shews the deaths for the four ye
ended 1865:—

DISTRICTS.	Population, 1861.	1862.		1863.		1864.		1865.	
		Deaths.	Per cent. to Population.	Deaths.	Per cent. to Population.	Deaths.	Per cent. to Population.	Deaths.	Per cent. to Population.
Grantown,	3943	77	1·95	73	1·85	66	1·67	63	1·34
Abernethy,	1928	39	2·02	38	1·97	28	1·45	18	0·95

We find, then, that the deaths have decreas
gradually every year, from 77 to 63 in the c
district, and from 39 to 18 in the other.
figures, the difference of ·85 per cent. o

the whole may seem small, but it really represents 49 deaths a-year, which is a very large decrease in a rural population, and more especially as the bad influences of too much wood in Highland inland districts, such as these, must be counteracted by altitude and the surrounding mountains.

Of course it is almost impossible that a yearly decrease should continue; and, besides, it may be that previous to 1855 the deaths were some years as low, if not less, than any of those given. (Since writing these notes, I learn that the deaths in 1866 were 70, which is just the average of the four preceding years.) There are invariably fluctuations in all districts; but no epidemics having occurred, we are led, without doubt, I think, to attribute the great and gradual decrease of deaths in that part of Strathspey, mainly, if not altogether, to the wood surface having been brought down to a more healthy proportion.

A similar plan of improvement among the woods is in progress in Braemar, and it will be to me very interesting to note the effects.

There is little doubt that much of the suffering inflicted on mankind by what was attributed to the disorder of the seasons, must be accounted for by their own carelessness and improvidence, as in the case of an over-clearance or allowance of woods and forests.

Some still say that Nature is the best forester in the sense of thinning or regulating the number of trees on the ground; but, neither in this, nor in the extent with which we are provided with them naturally, does it suit, as we have seen, to allow things to have their own way. Yet I am to take advantage of the fact of nature's bounty, and to say that the great importance of arboriculture is more manifest from the early care which she takes in covering the surface of the countries with trees.

It may be safely said that civilization cannot advance without trees, and that those must be the most civilized people who cultivate them on scientific principles.

Without its timber, Britain, and more especially other countries less favoura
situated as regards latitude and sea influenc
would, it may be safely said, never have
tained its present eminence, either politic
or agriculturally.

Purely practical men may say they w
nothing more to guide them as to which tr
are suitable to various soils, elevations,
exposures, and securing these, the results
effects produced on the crop must, as a n
ral consequence, be of the most satisfact
and of one kind, namely, healthiness;
while quite sufficient so far, it cannot subse
the purposes of science as to the health
the people, and other influences.

Practical forestry has made great stri
during the last thirty years. It has been sl
but sure; and from this I would fain pre
that so sure will be the ultimate success
arboriculture as a standing science in
country. I can well see, that to kno
tree, in every sense of the word, will
become the aspiration of every sound-think
interested man. But to attain to this, an
bring arboriculture, as a science for every-
use, within the grasp of not only the pract
woodman but the majority of landed prop
tors, it is necessary that some system for g
ance as to observations or other informat
should be established by a body of scien
and practical men. It is no doubt a w
field, out of which much more may issue t
the few indications I have sketched. Inde
I have only introduced the subject.

There are various other aspects of
question equally interesting and importan
those I have dealt with. Enough has, h
ever, let me humbly hope, been said, to sh
the immense importance of the subject.

I know of few things at the present da
deserving the attention of political econom
as the present extent and distribution of w
over a country. It is plainly the duty
Government to take this question in ha
and it is, I think, equally evident that i
one of the duties of this Society to agit
for a scientific inquiry on the subject.

THE GAME-LAWS.

MERS not unnaturally complain of
e over-preservation of ground game
respective farms which they lease.
tanding a special clause in the lease,
ffect that the lessor reserves the
is not expected that the numbers
allowed to multiply to the extent of
of partially injuring, but materially
rops of barley and wheat and oats
t yield a return to meet the rent-day
e case, and labour and money in-
n the other. To a disinterested
, a practice of this kind looks very
cidal policy, and, in the interests of
lessor and lessee, should be dealt
he principle of even-handed justice.
ndlord, on the one hand, feels that
g ought to be done without compro-
s rights, and the tenant is clamant
point—hence the desire to pass a
actory to both through Parliament.
sing forces in this case are provided
nsiderable momentum, and violent
is a thing consequently to be
We hail, therefore, the appointment
t Committee, to investigate and re-
erately upon the matter, as likely to
e compromise that all parties can
Whatever may be resolved upon
e pressed forward with all the de-
ich the forms of the House permit,
stinating and procrastination have
ndency to widen the breach between
ing parties.

not be altogether ignored the pre-
tion of the landlord; it is very
from what it was forty years ago,
rting with the gun was not so
ive to the lessor. Farmers and
al men, generally, prefer selling
ls at the best market, and the land-
d his factor are only exercising
business habits in following the
w.

f our landed proprietors, of course, preserve for their own sport and that of their friends, and command their keepers to attend to the rule of multiplication, so that on "red-letter days" they may have their great battues, and kill their hundreds, and, in some cases, thousands, of heads of game of all kinds in a few days. This is a kind of sporting, if it may be so called, that has a serious significance upon the balance-sheet of the farmer. The seed that has been deposited in the carefully prepared ground, and from which was expected a rich golden harvest, has been preyed upon by an army of vermin only second in importance for destruction to the locusts of old. And who is to assess the remuneration to satisfy a disheartened tenant, and probably an imperious landlord?

We can well understand the propriety of preserving winged game, as not only offering excellent sport to the country gentlemen, but interfering in a very slight degree with what the farmer earns his crust upon. That is a fair field for cultivation, and for propagating the brood that fall to the quick eye and steady aim of the sportsman, and it should be, as it would be, the interest of every farmer of position and character to protect it. Only give him protection in turn, and he would be a very ingrate that would abuse the privilege. We would deprecate very much an undue interference with a landlord's rights and privileges. The levelling-up tendency of the age affects them already sufficiently severe, and our humorous contemporary, *Punch*, evidently is so impressed in their interests, asking if, among other things, "a Landlords' Preservation Bill is not desirable?" We all the more readily suggest, that a spirit of fairness on their part should animate them in their desire to compound with farmers upon the question of hares and rabbits.

But what will be accepted by all comes to be the difficult point? The lessor says that Mr Loch's bill is too sweeping in its clauses, not having only a prospective, but a retrospective, influence, cancelling all clauses, whether stringent or otherwise, that stand in leases between lessor and lessee as to hares and rabbits, giving permission to any number of persons employed by the lessee to shoot over farms. Lord Elcho inserts a clause so worded that the farmer must either shoot himself, or, if he appoints an assistant, that the latter must be approved by the landlord. The farmers' friends, as represented by Mr M'Lagan and Mr Loch, argue after this wise, that the sooner they get rid of this troublesome pest the better, and insist that the farmer, whether bound or not, should at once have the chance of refusal of being lessee of the shooting at a fair remuneration, and that he should be hampered by no conditions whatsoever, unless these be common to buyer and seller.

There is really no hardship that we can see involved in these conditions. If farmers choose to become lessees of the shooting over their farms, and pay a proper rent for the privilege, there is no one that is better entitled, barring the landlord himself. Besides, their mouths would be shut against all cavilling as to injury to crops, &c.; and who could the opposing party put up that would be likely to take on the same self-imposed responsibility to the property? The argument that Captain Horatio Ross propounds as to the unlimited aggression of farmers' assistants, if not of farmers themselves, of piracy among the winged game, is not so chimerical as at first sight it might appear. There will be always abuses to any privilege, as witness poaching itself under our present *regime* of laws; but it appears to us that every proper-minded farmer would be a gamekeeper himself, and summarily dispose of every scapegrace to the safe keeping of the law and its penalties.

The clauses as to compensation and assessment appear to meet with considerable unanimity, and the transference of all cases in dispute from the Justice of Peace Court
and Quarter Sessions, to the Sheriff
also commendable, and not likely
with much opposition. The great
will be upon the clause which gives
power, despite of his landlord, to ki
and rabbits, the compensation for s
to be fixed by a valuator named
Sheriff. This, at once and perer
strikes at the root of bargain-makin
the principle of the articled auctionee
voice of the highest bidder is not cc
and the landlord who does not regar
value, and he who does, are placed
equal footing. The pursuit of plea
which certain individuals are ever
offer exorbitant sums rather than
prived of it, is at a discount, and the
tects the farmer, so long as he is inc
offer a fair valuation for that class
stock. This seems to be unwa
dealing, but what other course i
ticable? In the one case, the sp
spends a fortnight's holidays, and des
hundreds, and thousands probably, t
been protected for him; and in th
the farmer and his assistants destroy
they would any other vermin
their fields at any season. The one
a case of sport, the other that of protec
maintain hares and rabbits for a few
sport, and refuse to destroy them t
a sportsman lessee, is to do so p
the expense of the farmer. If
men will let arable land, they
prepared in some measure to prote
they find it to be a more profitabl
ment to let it with a shooting-box, w
prepare and provide for accordin
half measures will satisfy the farn
pays a large rent for his holding; a
can be no doubt that there is good
action in Parliament, as the over-
tion of game creeps insidiously, anc
an irresistible influence, upon the mi
commercial owner in the one case,
of the aristocratic sportsman in the c

YSTEM OF HUSBANDRY FOR THE INCREASE OF FOOD PRODUCTION.

dditional source of increased supply
that from the improvement of the
his country already reclaimed, would
clamation and improvement of the
tracts of mountain and moorland,
ous districts of the United Kingdom,
now in a state of nature, the most
are capable of immense improve-
d of yielding a very great increase in
luction, and as great an improve-
the quality of stock, particularly of
So great are the capabilities of the in-
f stock, as to appear to be almost
imit, and that from sources which
y be said, as yet dormant, but which
ire the application of capital to de-

general adoption of the system
l would certainly greatly reduce the
of land in the United Kingdom at
nder the growth of corn, but the im-
rtility of the soil by such manage-
ing pursued would probably, in a
gree, if not wholly, compensate di-
extent.

regard to the kind of stock that
be kept under the system of hus-
ggested, but little need be said.

only remarks that need be offered
rd to cattle are, that the shorthorn
ould always have the preference, as
ithout doubt, the most profitable,
r early maturity and their propen-
tten. All the black and Highland
are, compared with the shorthorn,
ers, and their flesh of inferior quality,
lly up to the mark in condition,
ir beef is in the very highest request.

calves produced on the farm should
l, and put to the bull when about
months old, and a selection made
m when they calve, to increase the
stock, if such be required, or to re-
h cows as it may be desirable to feed
hose that may not be required for
the purpose just mentioned should be fattened off by the time they attain the third year of their age.

As to sheep, the list of eligible varieties for the purpose of the suggested management includes the Leicester, the Romney Marsh, the Lincoln, the different varieties of Down sheep, and the Cheviot. These offer ample scope for a selection to meet the requirements of any locality, climate, or character of soil.

To put the system of management suggested into operation would require a great increase and alteration in arrangement of the homestead, particularly on farms of which the whole or the greater portion of the stock might be cattle. The system would also necessitate a re-division of the farm into such number and extent of enclosures that the extent of the several crops, according to the rotation proposed, might be as equal as possible in each year. The purposes in question would, no doubt, involve a great outlay of capital to effect; which, however, need not cost the owner of the property anything, as the necessary funds could be obtained by loans, to be repaid by half-yearly instalments, as a rent-charge on the property for a limited period, through the invervention of a Land Improvement Company, of which there are at present at least three in being. The rent-charge, whilst it continued, should be paid by the tenant as an increased rent, as due to an improved annual value of the farm, from the permanent improvements made for the purpose of setting the system of management suggested into operation; and which, with in all probability a considerable addition, would accrue to the landlord as an increase to his income at the expiration of the period for which the property might be subject to the rent-charge in repayment of the above referred to loan; so that the permanent improvements required for the adoption of the system of management suggested would not only be effected without any cost to the owner of the property, but his income would in a short time be considerably increased by the proceeding, for which in a pecuniary point of view there is every inducement.

Besides the permanent improvement of the property that would be required for the adoption of the system of management suggested, it would be necessary that the occupier of the land should be possessed of a capital of from £12 to £15 an acre, in order that the system might be carried out with all the advantages of which it is susceptible. The want of capital amongst tenant-farmers, as a class, or rather an ambition to occupy a greater extent of land than they have the capital to manage to the best advantage, either as to increased fertility of the soil or pecuniary benefit to themselves, has been the main cause of agriculture not having generally hitherto made a corresponding progress in improvement to most other objects of industry in this country, notwithstanding the encouragement of improvement offered by national agricultural societies of the United Kingdom. Should, however, the system of husbandry herein suggested and recommended be generally adopted, it will necessitate the employment of a much larger amount of capital per acre than is deemed necessary for any system at present usually practised, or the reduction of the extent of the holding, so that the farmer's capital may be at least £12 per acre; and the importance and position of the occupiers of farms may be estimated rather by excellence in the cultivation of their farms, and the amount of profit realised in proportion to the capital employed, than by the extent of their holdings.

In conclusion, it may be remarked that there does not appear to be any insurmountable difficulty in being independent of a foreign supply of animal food for the present population of this country, or for its future increase almost, however great that increase may be, provided there be a cordial co-operation of owners and occupiers of land in the employment of capital in permanent improvement of landed estates, and in increasing the fertility of the soil by improved agriculture, to which may be added the assistance that would be rendered in a work of such great national importance and benefit, as increasing the fertility of the British soil, by the community at large, by loans of capital through Land Improvement Companies for every purpose of permanent improvement. A means by which cattle and sheep may be increased almost without limit has been suggested in the foregoing, which, although it might not be carried into full effect at once, yet it might gradually come to be generally adopted throughout the United Kingdom. It may also be further remarked, that those landlords who may be earliest to provide permanent improvement of their property, required for carrying the system of management suggested into effect, would soonest and to the greatest extent be rewarded by an improved income from their estates; and the tenants who may be first to adopt the system would obtain larger profits on their capital previous to, than when the practice of the system might become general, and thereby produce the intended effect of cheapening the animal food of the people.

And when the system of improved husbandry recommended in the foregoing remarks may come to be generally adopted from £30,000,000 to £50,000,000 now annually expended in the purchase of food o foreign production for the inhabitants o Britain, may be saved to the country as a fun to be applied in the profitable employment o the working-classes in manufactories, and t the benefit of all classes of the community o Britain.

ON A CHEAP METHOD OF STEAM CULTIVATION.

BY WILLIAM FISKEN.

use of steam power for purposes of llage is now greatly on the increase, many farmers, almost a necessity for bandry. It is, therefore, becoming essary that agriculturists should have tain data or fixed principles and facts, them in choosing the best kind of ltivating tackle, in which they shall eir money with safety and economy. object of the following pages to bring eview the various systems of steam ow competing for public patronage, furnish the farmer with such means nable him to examine for himself the f steam cultivating machinery, and to vhich is the best suited for his pur- dependent of the fickle awards of or the uncertain results of trial fields. cussing the merits of the various sets n tackle, there is no great room for of opinion so far as the mere culti- mplement itself is concerned. No mplement suitable for steam-power appeared to supersede the famous alance plough and digger. Its merits fully admitted, and it will likely retain place as a ploughing implement as steam-power is used for tillage pur- However modified or varied in form, en balance plough will outlive all its It may be improved in some minor as is still the case with the antient rivalled swing plough, but the main e and plan will remain. The con- experience with the Fisken balance may lead to shortening the distance the shares. In some instances this n done with great success, and when de of effecting this becomes more od, it is likely to be adopted by turers. The length of the balance may advantageously be shortened one ecially for light land or seed furrows. This shortening of the implement would both cheapen its construction and enhance its general adaptability. Neither is there great reason for diversity of opinion between the various kinds of steam cultivators; all are good in their way. They are not very different in their performances, or in their prices, and their minor details or merits may be safely left to the farmer's own choice. Neither is it our purpose to discuss the minute merits of the different kinds of engines employed in steam cultivation. So far as the engines and implements are concerned, their variety or differences do not enter much into the difference of cost of steam tackle, or their diversity of character.

ON HAULAGE OF STEAM IMPLEMENTS.

That which distinguishes most the different sorts of tackle is the various modes of haulage. The method of connecting the engine power with the cultivating implement causes the diversity of sets and the great differences in cost. In this lies the great difficulty in connexion with steam cultivation, and the consequent diversity of opinion as to the best method of yoking the engine to the plough.

The various awards hitherto given by different sets of judges at the annual agricultural competitive trials of steam tackle, have failed to solve the problem of the best method of haulage. Every new trial has resulted in giving the award of merit to some new method of haulage. At one time the award was given to the two winding drums on one engine and disc anchor, at another to the winding sheaves and anchor. The clip-drum and traction-engine, with disc anchor, carry off the prize for the best cultivating tackle by steam power at the Newcastle-upon-Tyne competition. And now at the Leicester competition trials, last year, the chief place is assigned to the two traction-engine system.

It is every way likely that the next competition at the Royal Show the judges will award the palm of merit to some other method of hauling the tilling implement. It is very evident, from the diversity of opinion shewn by these awards, that the Royal Agricultural Society of England has not yet decidedly and definitely determined what is the best method of applying steam power to land culture. The want of certainty on this point is the more to be deplored, as the best mode of haulage is what most concerns the farmer. The haulage part of the tackle is not only what may be called dead, or unproductive, but it is the part which causes the greatest difference in first cost, and is most liable to tear and wear; besides, the mode of haulage has much to do not only with the economy, but with the adaptability of the system.

The report of the judges on steam cultivation at Leicester cannot be looked to as affording the means of deciding what is the best application of steam power for the cultivation of the soil. That report fails in several points to give the information necessary to form a proper estimate of steam tackle. The great end designed by public competitive trials is to enable the farmer to answer for himself the important question, What steam-tackle will till my land cheapest? This is the main point the farmer must look to in the purchase of steam tackle. The cheapness, however, must have reference to the whole bearings of the tackle. It is not meant that the farmer should be penny wise and pound foolish; the matter of cost must take in ultimate as well as proximate cheapness. It is, therefore, of no consequence to the farmer whether the system be direct or indirect, whether the engines be traction or portable; the question still recurs, what system in the long run will enable the farmer to perform all the operations of tillage with the greatest profit? Large occupiers are informed by the Leicester judges that steam tackle on the direct principle is alone worthy of their notice, but they give no sufficient reason for this preference. It had not hitherto been decided by any competent authority in these matters, that the direct principle, as it is called, was necessary to render tackle suited for large are
appears to be a baseless assumpti
judges. In their application of the pr
directness to the steam-tackle, they
have no fixed or definite rule. Dir
definite enough as a mechanical ter
used, at any rate, in different ways
rent steam-ploughing projectors.
claimed direct haulage as the me
system, as it dispensed entirely wit
If the judges at Leicester apply
direct to the two-engine system, ther
be different from Boydell's use of the
different from their own use of it, wl
apply it to the one engine and clip,
the implement one-half of the time i
round the disc anchor. In this
method of haulage for one-half the ti
more direct than what is done on
the time with the roundabout system
called; so much for the fallacy of
the term direct a test of stea
The judges give no reason for e
the roundabout system from being a
to large areas, except it be that the s
not direct, and yet from the above c
tions the advantages for hauling are
the side of the roundabout; at all
is the roundabout system, as tabu
Class II. of the Judges' Report, whi
vates per day more than the two-en
tem, the directest of the systems; a
cost of the work be taken into acco
the roundabout system which does it
by a long score, even after making all
for time and cost of shifting tackl
judges allow that with the roundab
tem two or three fields may be c
without shifting the engine (see pag
report). How many or few shiftings
case would be required to cultivate th
farm, and if this roundabout system
the same kind of work, and at much
than the direct or double-engine s
surely requires some more valid reas
that the tackle is direct to convince
that the roundabout system is not
large areas. It would have been m
tinct and definite to have divided th
into these systems which require

and those which require only portable
them, but still the division decided
as to the adaptability of the system
or small areas.

ather a remarkable fact that the judges
report gave no information by which
ler may discover the amount of engine
consumed by the different systems
rial. The amount of coal consumed
different engines is not stated, and for
rangest reason, "because," say the
"at the present day so many farmers
rom their own practical experience the
t of fuel required for the daily work of
le engines of a given number of nominal
' power." I do not know where these
formed farmers are to be found, but
e not certainly among the number of
of steam tackle reported on by the
Cultivation Inspection Committee ap-
d by the Royal Agricultural Society,
their report there is the greatest variety
amount of coal consumed by engines
same nominal power. Coals are a
lerable item of expense in steam culti-
; an approximation to the quantity con-
l for the work done would have been of
value in the Leicester report. In the
ction Committee's Report some farmers
that 35 per cent. more coal is required
ouble engines than for the single. It
have been of much public benefit had
dges at Leicester condescended to have
some definite information on this point.
public report on the comparative merits
am tackle must be defective if the item
l is omitted.

rhaps the judges imagine they have
sufficient data to discover the amount
gine power, by their tabulating the
nt of earth moved per nominal horse
r per hour, but in this also the main
nt is awanting. The implements at
were not going at the same depth nor
e same speed, and the merest tyro in
mechanics knows that these differences
lestructive of accurate results—indeed,
r the comparison worthless.

is rather unaccountable, too, that the
s should have connected in their report
so definite a thing as the weight of earth moved with so uncertain a thing as nominal horse power. There is no intimation given as to what the judges mean by a nominal horse power, whether it is the size of cylinder and pressure, the heating surface or fire grate surface, all which may enter into the data of nominal horse power; and, although a standard had been given, every one knows the nominal horse power is no index to the real power which that engine may give out in certain circumstances. The engine with the smallest nominal power might, in reality, have given out the greatest amount of power of any engine on the trial field, for anything that may be known from the report of the judges.

There is another fallacy running through the report which renders its conclusions useless in a great measure—that is, the multiplying the short time the different sets were at work into a full day's work. It is evident that for the hour or two the particular set was at work there may have been some favourable or unfavourable element temporarily affecting the result, and these temporary elements are consequently multiplied into a large amount either for or against the particular set. The whole result, tabulated as the quantity of work done per day, is completely vitiated by the uncertainty of the data. It is difficult to know what practical end the judges meant these vague conclusions were to serve.

The judges allude so often to the virtues of the tail-rope, and the advantages of economizing its power, that the reader is led to imagine that they had discovered some mine of power bordering on the perpetual motion in this tail-rope, and that steam cultivation would be greatly facilitated if farmers and machinists would but utilize this hidden power. We are afraid the judges in this case are the victims of their imaginations. It is, indeed, true that in animated and inanimated mechanism the tail has great power in directing the head, and the judges may have had some vague notion that the tail-rope of steam tackle had similar virtue. The judges tell us, "that a little over 2½ miles per hour, an ordinary low strain on the tail-rope, if not utilized, absorbs 3¾-horse power per hour;" but they forget to tell us what was the length of tail-rope which required such traction power, for, like other tails, there is no standard length for steam tackle tail-ropes.

It is also worthy of notice that the four direct sets which were put under trial before the judges, were all belonging to one firm, and all wrought by the servants of that firm—a fact sufficient in itself to shew the absurdity of conclusions drawn from the working of tackle in such circumstances.

Altogether, the report of the judges at Leicester on steam cultivation fails to afford that data which would be useful to guide one to make a selection of the best steam ploughing machinery.

Had the report been a private document, there would have been less cause to criticise its contents; but when it is put forth with all the authority of the Royal Agricultural Society as a guide to farmers in making so costly investments, every one is challenged to examine its conditions, and it becomes a public benefit to point out where they are unsatisfactory fallacious, and misleading.

In order to furnish farmers with the means of deciding for themselves what is the cheapest and best steam tackle, it shall be necessary to bring under closer review the the various systems, with their merits and demerits.

THE TACKLE.

The Fisken complete system embraces the famous balance plough and cultivator, or any other cultivating implement whatever which works by haulage, the self-moving anchor windlass, and the conveying of the power to the moving windlass by means of an endless driving band or rope. This driving rope conveys the power from the portable or stationary engine to the field windlasses. The double combined anchor windlasses, and the endless driving-band constitute the peculiar features of the Fisken improved system of steam cultivation. A self-moving anchor windlass is placed on each headland of the field about to be cultivated or ploughed.

Each windlass has a large horizonta
drum hung beneath the framing, on
steel wire rope coils and uncoils al
as the plough is either hauled
drawn from it. The windir
and windlass, or anchor windlas
along the headland opposite the
the work proceeds, and each windl
the implement directly to it from t
site headland, without the wire rope
round any snatch-block pulleys or
pulleys. The anchor windlasses o
it were, the place of the two engi
have all the advantage of direct ha
the single winding of the wire s
which are claimed by the two-engin
The windlasses receive motion from
less driving band, which again re
motion from the portable engine. T
which gives motion to the endless
be placed at any convenient spot nea
to be ploughed, and may be any
engine power, portable, traction, or s
The driving band or rope is carri
the field to be tilled, on bearing pull
3 or 4 feet from the ground. Thes
are attached to light portable fram
placed in position in the line of rop
each corner of the field there is pla
is called a corner pulley, securely a
to bear the strain of the driving ro
driving rope is connected with ea
lass, by means of a horizontal shea
on the top of each. This sheave give
to the main winding drum. Betw
driving sheave and wire rope windi
there are interposed the usual windl
ing and clutches. The driving ro
moves at the speed of the peri
the fly-wheel of the engine, is kept i
working tension by means of a ten
ley, under the control of the engin
It is evident that, as the driving rop
at a much higher velocity than the
it has a proportionally less strain on it
strain of the main hauling wire ro
speed of the driving rope is reduce
windlass to the speed of the plou
and has, consequently, a leverage
plough rope in proportion to it

over the plough; for example, if the driving rope is going 24 miles an hour, and the plough only at 2 miles an hour, then the leverage of the driving rope over the plough is twelve to one, or a strain of 2 cwt. on the driving rope produces in that case a strain or pull of 24 cwt. on the plough. The mode of action is easily understood by those who know the principle of virtual velocities. The anchor windlasses are moved along the headland as the work proceeds by means of a small winding drum on each, acting on a rope anchored ahead of each windlass. This winding drum for the forward motion of the windlass is put in motion by a clutch whenever the attendant wishes. Each windlass is moved forward after each turn of the plough, so that the windlasses are always kept in a line with the working implement.

The windlass framing and wheels serve the purpose of anchors, to resist the strain or pull of the plough; and their resisting power is increased by a coulter penetrating the soil, and removable when the windlasses require to be shifted to another field or on the roads.

The windlasses travel on four wheels, and have a pair of draught shafts attached to each for facility in shifting, and these shafts are used also to guide the windlasses when at work. The windlasses are always ready for shifting, and no time is lost in preparing for removing them, or in placing them in working position in another field.

Each windlass when at work has an attendant, whose duty is to clutch and unclutch the main hauling-drum at each turn of the implement, to assist the ploughman in turning, or to work the travelling rope porters. As soon as the plough is hauled up to the winding-drum it is instantly unclutched, and the attendant at the other windlass at once clutches his winding-drum, and the plough, or cultivator, immediately begins its return journey, and thus without scarcely any loss of time the implement is kept moving backward and forward alternately between the two anchor windlasses.

The engine does not require to stop or reverse at the turning of the implement, but runs continuously on, and the engine-driver does not require to attend to or watch the turning of the implement. The engine may be entirely out of sight of the attendants in the field. The windlasses are geared and ungeared alternately without the least jarring or breaking of the wheels while the engine is running at full speed.

The great facility in reversing the implement without stopping or slacking the force of the engine, is effected by a simple and beautiful arrangement of friction and eccentric clutches, and they require to be seen at work to give one a proper conception of their value and efficiency. It will be seen from the above description that the anchor windlass has only the single strain or pull of the implement to resist, and consequently the anchorage does not require the great weight necessary in the double strain-anchor, such as in the case of the clip-drum anchor, or double-drum engine anchor, when the implement is pulled away from the engine by a double of the rope round the off anchor, and causing the anchor to have twice the pull of the implement to resist. This immense strain on the anchors in these systems renders their working very cumbersome and unhandy from their great weight, and the means necessary to resist so great a strain.

The anchor windlass can be moved forward on the headland, or backward, without the plough being in motion, and this is often found to be a great advantage, and renders the working of the anchor windlass much easier and handy than the double-strain anchors.

A set of tackle on the Fisken method, consisting of a ten-horse power traction engine and tackle, has for the last two years done the principal tillage work on the Mains farm at Roundhay, near Leeds, occupied by Mr Thomas Backhouse.* The tackle has also wrought for hire on a number of neighbouring farms. The tackle has been under the management of two intelligent young men, James and Thomas Backhouse, sons of the occupier. The Messrs Backhouse appear to be greatly pleased with the performances of the tackle, and with its great adaptability to general tillage operations. The many advantageous features of the Fiskin system were readily appreciated by the Messrs Backhouse; and the success of the system in its first stages has been greatly aided by the zeal and mechanical skill they brought to bear in developing the various capabilities of the system.

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* An engraving of the tackle will appear in a subsequent paper.

After two years' experience in managing the tackle, Mr J. Backhouse now writes :—" I always thought a great deal of the principle of this tackle, and experience has confirmed my first impression. I can now speak with confidence, that I think this arrangement is superior to any other system of steam-ploughing either with single or double engines." This testimony of Mr Backhouse is the more valuable as it is the result of careful comparison with other systems of steam tackle.

The Fisken tackle has the merit of great simplicity and adaptability to general tillage operations, and fitted to work with ease and efficiency on any field, and all kinds of farms, and during wet as well as dry weather.

It can now be shewn more easily in how many points the Fisken system surpasses the two-engine plan of cultivation. It is rather remarkable that the two-engine system is but a revival of the plan first used by the late Lord Willoughby and the Marquis of Tweeddale. Both of these noblemen, many years ago, used two engines in steam tillage. The present system of two engines differs only in minor details from what had been tried before, and failed through the many drawbacks which inherently encumber the system.

The two engines, as at present used in steam cultivation, have the disadvantage of being unable to work on all kinds of fields, or in wet and showery weather. Neither are they suitable for the lighter operations of cultivation.

On the other hand, the Fisken tackle can cultivate any field, although the sides be crooked and irregular, capable of being cultivated by horses, and can work in wet or showery weather. On this point of adaptability Mr Backhouse writes :—" I am fully persuaded that we can work when the traction-engines could not work at all, and we
have ploughed fields that the double engin
could not work upon owing to the inclinin
positions of the fields." Another farmer, wh
has had for years a traction-engine and cli
drum, writes me :—" It is a great inconv
nience to move an engine continually alo
some headlands; indeed, if the weather
very wet, and upon some land, it cannot
done." Mr Backhouse says of the Fisk
system :—" If the weather is fit for men to
out to work, it is fit for the tackle, as we c
work in weather when there would be no p
sibility of the double engines moving alo
the headlands." It is well known that on w
seasons the double or traction-engines a
almost useless, and in order to do any wor
they have to resort to the claw-anchor a
roundabout method.

The traction engines also do great dama
to the headlands and other parts of the fie
over which they have to move, with th
great weight.

The Fisken system has facilities whi
belong to no other for doing the heavi
kind of work to which any tackle can be p
and also for doing with economy the ligh
kinds of field operations required on a far
indeed, the Fisken tackle has so great fac
ties for general field operations that it w
shortly drive team traction from arable fie
altogether.

In order to bring out more clearly
comparative merits of the Fisken system a
the double-engine method, we shall supp
them both put to the cultivation of a 40-a
field, rectangular and equal sided. This gi
450 yards, or nearly, to each side of the fie
and suppose that the tackle in the c
of the two-engine are two tens, or ten ho
power, with their proper tackle. In cu
vating this field with the double eng
tackle, one of the engines weighing, with co
and water, 14 tons, 6 tons have to traverse tw
over one side of the field—that is, 450
450 yards—equal 900 yards. Then
other engine, with similar weight, has
traverse twice two sides of the field, or in
1800 yards; for we suppose that each eng
enters from a corner of the field, and retu
to the same place after the field is plough

tons of machinery have to be over soft land a distance of 2700 d that during the tilling of the field. ngines require costly machinery to hem to move on soft land, while at weight is doing much damage to le land on which they move.

during the time of working, these require about 40 tons of coal and hat is, 35 tons of water and 5 of coal, ter them over the arable land.

the case of cultivating the 40-acre the Fisken system. The engine is hile at work at or near some corner ld, or at any convenient spot where y be obtained. The power is con- m the engine to the windlasses on lands by the endless driving band on ring pulleys ; the conveyance of the es not damage the headland in the he travelling of the windlasses along land does less damage than the cart- he water and coals after the two and consequently the weight of the s may be written off against that of the f coal and water ; so far as damage he windlasses do less than the cart- e plough or cultivator and wire rope ling drums being common to both there remain, then, the two different conveying the power to the wind- for the haulage of the implement.

case of the two engines, the two drums and the power for driving brought to act directly on the im- t the cost of a second engine, and of each engine having travelling ove it on soft land, and in addition a man and horse, and sometimes two horses, have to be constantly employed in carting water and coal after the engine. All this is a cumbersome, complex, and costly method of conveying the power to the winding drum in order to secure its direct action.

In the Fisken system, as has been stated, the power is conveyed to the winding drums on the windlasses by means of an endless driving band between them and the engine; this driving band remains in the same position during the cultivation of the field, and does no damage to the land. There is no carting of coal or water into the field. The whole cost of the driving band and its appliances will only be about £25 ; while to do the same costs about £600 or £700 in the double-engine system. The cost only of the water-cart required for the double engines covers the conveying-power tackle in the Fisken plan. The cost thus of supplying the power to the winding drums of the double engine set consists of the cost of a second ten-horse engine ; of the machinery necessary to make the two engines self-moving ; of the cost of carting the water and coal to them all day ; besides causing damage to the land, delays arising from the obstacles of entering and removing from the field ; the loss of time arising from wet weather, and the inability of the traction-engines to work on all sorts of fields or farms. These items make the cost of the machinery for the double set about £600 or £700 more than is required for doing the same thing by the Fisken tackle, and requires the daily cost of 5s. or 6s. additional, which should be allowed for carting of coal and water.

The Farm.

WEEDS.

IT is a suggestive circumstance that while the cereal plants upon which we depend for food yield but a small amount in proportion to the seed which produces them, the weeds which infest the fields which bear them yield enormous numbers of seeds. So large indeed is the increase of weeds, that it is not unreasonable to suppose that the beneficent Creator has designed them to play an important part in that economy which concerns the life of man, and the animals which are entrusted to his care. Man makes progress but slowly in the arts of civilisation, and the department of true economisation of material, and in the using of waste substances he is only, as it were, beginning to learn. But it is gratifying to note that he is making very considerable progress in this latter direction, so much so, that we believe the most prominent feature of the scientific advance of the future will be in what is called the utilisation of waste products. Already some remarkable discoveries have been made, by which it may almost literally be said that masses of base material have been transmuted into gold. Hence it is that some indulge the hope that for the weeds which infest our fields, and grow so rampant amidst the stalks of corn, some highly useful purpose may yet be found. Be this as it may, under present circumstances weeds are waste and wasteful productions, which it is, or should be, the duty of the farmer zealously to eradicate. And thus, even granting that a useful purpose may be found for them, for it is obvious that a weed, whatever be its inherent value, is a weed still in the farming sense of the word, if it grows in juxtaposition to a plant which it is specially desired to cultivate. Thus, a turnip may be looked upon as a weed in a field of wheat, just as, per contra, a stalk of wheat may be looked upon as a weed in a field of turnips. We have said that the increase of weed seeds is enormous; thus, the groundsel has on each plant nearly seven thousand seeds, the chickweed nearly five hundred, the corn sow thistle nearly twenty thousand, while the red poppy bears on a single plant the enormous number of fifty thousand seeds. Hence, if there is any truth in the proverb that one year's seeding is seven years' weeding, it will be seen how long a period of labour is brought about by so short a period of neglect. But it is so far fortunate, that, independently of the avoidance of the seven years' labour by the exercise of one year's care in getting rid of the weeds, there is a positive advantage gained by the increase of the crop which the weeds would otherwise infest by the stirring and moving of the soil when the weeds are being removed. Weeds propagate by their seeds, or by their roots, as in the case of the couch-grass, and in some others partly by their seeds and partly by their roots. Weed seeds are distributed first by what may be called the natural mode—that is, dropping when ripe from the plants, or carried about by the winds, as in the case of the downy seeds of thistles or the dandelion. It is obvious that the weeds will not shed their seeds on the land which they occupy if the plants are taken up before the seeds ripen. Hence is that farmers have it in their power to prevent the first of evils above named; but it not so easy to prevent the second of them—namely, that caused by the distribution the seeds by the wind; albeit they have much in their power, for if they cannot prevent their neighbours from allowing weeds to seed in their fields, ditches, and roadsides they can, if they will, prevent them from growing in like places on their own farms by

and early eradication. We say early,
ough it is incurring a double evil to
eeds to grow and ripen their seeds,
is an evil of a lesser kind to allow
lants to grow at all. For it is the
of good farming to permit the nutri-
ments in the soil to be availed of by
ful plants, not by the weeds, for it
not be overlooked that weeds with-
ry largely these elements of fertility
e soil. "This important point con-
with weeds has," says an able au-
"been overlooked; at least if not
ked, not much insisted on, and this
from the want of more analyses of
-namely, that weeds common to good
d soil, appear to possess some of the
portant chemical principles in great
es. Hence, weeds are a twofold
e, as they not only appropriate valu-
ce, but live upon the fat of the land,
course to the prejudice of the culti-
ibes. Analyses to the limited extent
they have been carried, shew that
lies and phosphates are abundant in
weeds, which is just what we should
rom our experience of the injury in-
by them on our cultivated crops.
ew us, further, that allowing such
seed, not only causes a perpetuation
evil consequences, but also tends, in
arger measure, to the abstraction of
the most valuable food of plants,
ly the phosphates."

these remarks upon the large amount
lizing constituents drawn from the
weed plants, which constituents
go to nourish the useful plants for
he land is destined, we submit that
sideration offers, or should offer, a
nducement to farmers to get rid of
s a source of great loss, altogether
dently of the evils arising from the
weeds allowed to grow to maturity;
n this latter point we have already
some remarks, and given enough
what bad farming that must be
llows weed seeds to grow to ma-
and bad as the farming is, it must
wed it is not seldom met with.

Should, therefore, weeds be unfortunately allowed to approach this stage, every other consideration should give way to this one—namely, absolute necessity of pulling them up before they cast their seeds. And this brings us to a very important point—namely, the way in which weeds are propagated on our lands, in consequence of their seeds getting mixed with the manure which is applied to it. It is a notion held by many, that weed seeds are killed by being mixed up in the manure. This notion is a fertile source of evil, which can only be got rid of by a totally different mode of treating weeds which are gathered off the land. Let it be understood that weed seeds have an amazing vitality, far superior to those of the useful plants we cultivate. Indeed, processes which would effectually kill useful seeds seem to have no effect on the seeds of weeds. We believe, therefore, the only effectual way of dealing with weeds is to burn them carefully, adding the ashes resulting from the process to the manure or compost heap. We do not except the weeds which propagate mainly by the roots, or those which have roots so bulky that they remain fresh, even after being some time in the manure heap, and on being applied to the land along with the manure, frequently again take root. Take, for example, that pest of some lands, the couch-grass, or triticum repens; this has an amazing vitality, and when gathered into heaps, or laid aside and well dried in a hot sun, seems withered up and dead. But its powers of propagating itself even then are by no means got rid of, and very little moisture is sufficient to restore it to its full vitality. The method of carrying it rapidly off the field and putting it into the manure-pit, is, in many cases, simply a good method of maintaining the vitality of the couch-grass, until the manure is removed to the land, a proportion of the couch-grass speedily taking root. The above remarks on the couch-grass apply almost equally well to the roots of the thistle, the dock, or other broad-leaved weeds. The only true way of destroying weed plants, and their seeds and roots, is to burn them. And this burning will be more effectually performed if, in place of having small isolated heaps, as large heaps as can be arranged be taken in hand; for the object is to insure as fierce a burning fire as possible, so that the damp and thick stalks and roots be thoroughly reduced to ashes. Nor, in view of this, will it be time thrown away, nor money lost, if in some spare corner a rough enclosure of stone or bricks be put together, in order to concentrate the materials, and increase the intensity of the heat. What is worth doing at all, is worth doing well.

With reference to the mode of extirpating weeds, such as couch-grass, docks, &c., a few words may be said. The couch-grass is provided with a long slender root, provided liberally with joints, each joint sending out a fresh rootlet very much like the strawberry plant. In working the land, then, any mode which cuts the rootlets up, and allows them to remain under ground, so far from extirpating the pest, tends only to perpetuate it. So far, then, as the getting rid of the couch is concerned, the plough is the worst, and the grubber the best implement which can be used, for the latter brings the weeds up to the surface, from which they can be subsequently gathered. The true way of extirpating docks, thistles, &c., is to pull them up by the roots; but as this is a work of some difficulty, and at best a tedious process, for no part of the root should be left in the soil, the readiest, if indeed it is not the best way, is to keep mowing down the weeds as long as this can be done. The following remarks by an able authority on the above are worthy of being inserted here:—

"Perennial and deep-rooted weeds can only be got rid of by proper preparation of the fallows. There is no mode so efficient as going with a three-pronged fork over the ground after the removal of the crop, and digging up the weed patches. Many deep-rooted weeds which attack pastures cannot well be extirpated by this method. Nothing, therefore, is so efficacious with them as constantly 'mowing them down' when their stems shew a few inches above the ground. This mowing should not be delayed till the usual time of mowing the pastures, as the
plants will have developed themselves
much. Mowing them regularly down at
stage we have above indicated will ultimat
insure their destruction, as the growing of
leaves is essential to the health of a pl
Bear in mind that 'as the leaves are the lu
of the plant, never in such cases allow
lungs to develop themselves.'" It is proba
that we have a greater power over weeds,
far as destroying them goes, than is
known by the use of certain substanc
thus, common salt has been tried by so
with great success in the case of cou
grass, and nitrate of soda for docks in mea
lands. The point is a very sugges
one, and deserves an elaborate and car
inquiry.

We have not yet adverted to the dissem
tion of weed seeds in land through their be
mixed with the seeds of useful plants. Li
need be said on this, as it has been treate
in other articles. We may, therefore, br
our remarks for the present to a conclusi
suggestively supplementing them by the foll
ing hints from a practical authority:—

"1. That it is desirable that farmers sho
become better acquainted with the English
botanical names of weeds, that they ma
enabled to refer to them in books, and thu
take advantage of the information and
perience afforded by others.

"2. That they should ascertain more of
habits of these plants, and what is the pri
pal cause of their existence on their farm
whether it is from the seeds having
previously dormant in the soil or sub
from their existence in the manure, or in
seed corn or clover seeds; from their ha
been wafted on the land by the winds
whether they have been propagated by v
cious roots, such as that of the couch, wh
have been cut, but not destroyed, in the
cess of cultivation.

"3. That they should thoroughly exam
their seed corn, and their clover, gr
turnip, and other seeds, in the bulk, prev
to sowing, and become better acquai
with the seeds of weeds, so as more easil
detect their presence. As the seeds of we

rly all small, the examination will more easily and more satisfactorily by a small magnifying glass or mi- e, such as the one I hold in my hand. nall glass may also be used for the ation of plants and insects. It is d used by botanists, and may be obtained of any respectable optician for about 5s.

"4. That when weeds do exist, farmers should well consider, and ascertain if they can, what are the most effectual and cheapest means of eradicating or otherwise destroying them.

THE IMPROVEMENT OF PERMANENT PASTURES.

IDES the sources of increased supply of animal food pointed out in vol. e 484, there are immense tracts of in and bog capable of being made to ry large supplies of stock, and which present only supporting deer, grouse, her wild animals and fowls, with flocks of sheep of a most inferior tion. These wastes, by the applica- lime, and judiciously placed planta- f timber trees suited to the climate nature of the soil, to afford shelter to k and ground from prevailing winds, e made available for the support of a increased quantity of stock of greatly ed quality.

-lying moors, when dry, may be still fectually improved by being broken up ons in succession, and after the surface been pared and burned, and a copious tion of lime mixed with the ashes of ned surface, sown with rape in July, e to be succeeded by turnips, and ips to be followed by swedes. The poken of should be eaten off by sheep, land should be then sown down with ds of grasses suited to sheep pasture st, after having been fallowed during vious spring and early part of summer. ode of improvement here suggested ble the flockmaster to fatten a portion stock, or to bring his supernumerary o market in such a forward state of ndition as greatly to enhance their value purpose of being thoroughly fattened, at which they would bear if sent direct from their pasture. In addition to the benefits spoken of, the pastures so improved would be capable of carrying a very greatly increased number of sheep, of a much superior description than can be the case without the short course of tillage recommended.

On flat bogs, caution should be exercised in not over-draining them, as peat, when deprived of moisture, becomes utterly sterile, from which it can never be brought by any means into a state of fertility. Peat bogs, it may be stated, have invariably beneath them the means of their improvement in beds of marl, which, by being spread on their surface, and left to be acted upon by the frosts of winter before mixing with the peat soil, will effect a permanent and very great improvement in the pasture. Where lime in a caustic state can be obtained without distant and expensive carriage, it will more speedily and efficiently, and also more economically, effect improvement of peat, by correction of its astringency, than by any other means; and this, added to peat ashes, will speedily produce valuable pasture.

In moorland, a thin concrete, composed of small gravel cemented by clay and iron oxide, is frequently interposed between the peaty surface and the clay subsoil. This concrete, although seldom exceeding an inch or an inch and a-half in thickness, is impervious to either water or air, and therefore produces sterility in the soil, and is so hard as to require implements of very powerful action to break it up; and, when broken, the ferruginous matter is insoluble, and possesses cankerous properties most obnoxious to vegetation. The concretion in question is known as "moor band," and the most obvious and effectual mode of dealing with it is, after draining to a good depth into the subsoil, to break it up by means of a subsoiling implement specially constructed for the purpose; and to apply, as a manure, some substance that will convert the insoluble oxide into a soluble salt of iron, in which state it may pass in solution by water into the drains in the subsoil. For the purpose spoken of, Glauber or Epsom salts, which are respectively the sulphate of soda and sulphate of magnesia, may be applied, but with a preference of the former to the latter-mentioned salt. The *rationale* of the action of the substances in question is, that the elective attraction of sulphuric acid to combine with iron as the base of a salt is stronger than that for either soda or magnesia. The sulphuric acid leaves the soda or magnesia as bases, and combines with the iron, forming sulphate of iron, or green vitriol — a salt perfectly soluble in water, and which is conveyed i solution in water to the drains.

In slacks between the drier portions mountain pastures, there are frequently co siderable extents of ground occupied aquatic plants growing upon underlying sta nant water, and which are nourished by th own dead and decaying substance. Tl means of the improvement of these wastes obvious enough in the withdrawal of the sta nant water from beneath the plants in questi by draining, which can now be effected wit out difficulty by the power conferred by "T Land Drainage Act, 1861," by which outf drains can be carried through adjoining a intervening estates to natural watercourses the neighbourhood. When the stagna water is withdrawn from the mosses spok of, and which are commonly known under t designation of "live mosses," they speed decay, and become of the nature of peat, a may then be treated in their improvement the same means as have already been reco mended for the melioration of such soils.

THE CULTIVATION OF ARTIFICIAL GRASSES.

(A Paper read by Mr J. SCUTT, of Bere Regis, before the Winfrith Farmers' Club.)

THERE are a great variety of plants which may be classed under this head, but I shall confine my remarks to a few varieties with which we are mostly acquainted, and which constitute a large portion of our forage crops. First, I will ask your attention to a few remarks on ryegrass—the green or perennial, white or annual, and Italian. These seeds do not appear to have been known in this country until about the middle of the 17th century, from which time they gradually grew into favour; but farmers then not under- tanding the difference in the varieties, and by constantly saving the seed from the first rops, it resulted in the prevalence of a short- lived variety. afterwards termed "annual or white rye-grass,"* and unfit for laying do of lands to two or more years. This natur directed attention to the selection of a m lasting variety, which was supplied by Mr Pac whose perennial grass has since become kno throughout the country; but our best per nial seeds are obtained from Devonshire, a known as the Devon rye-grass. This vari is mostly in favour, as the hay made fron is not of as coarse a nature as that of white or annual, the stalks being smaller, w

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* A name then applied, and since continued, ur the mistaken notion that it was identical with the w darnel, or Lolium album, of Gerarde, whose figure description, however, only apply to that now rare strictly annual species, the Lolium temulentum Linnæus.

ot-leaves, which fully compensates
extra length and coarser stalks of the
esides rendering the hay less wiry and
latable to the stock fed on it. Italian
is a variety very generally esteemed
more vigorous in its growth, gives a
braird, arrives sooner at maturity,
reater abundance of foliage, grows
ler, is more upright, or less inclined
d on the ground, and one of its
tinguishing characters is, that it is
l by cattle to any of the common
d which has been proved by many
ent parts of the country, while it
rly, bulky, and quickly succeeding
which renders it an invaluable grass.
gard to its duration, I think it can-
alled more than a biennial, and the
produce is obtained in the first
here are many different opinions
e real merits of the Italian rye-
t perhaps the best proof is the
d increasing demand for its seeds.
e a great many varieties of the
well as other rye-grass, and, although
may be grown in almost any de-
of soil, it has a certain preference
y which its growth is naturally in-

Thus it requires a little considera-
rehand as to the respective suit-
f the crop and of the soil, which
le us to avoid those unsatisfactory
at so frequently occur when these
re not attended to. A temperate
nd moist soil are the most suitable
owth. Excessive heat or extremely
ates are equally unfavourable to its
We find the difference of climate
vn coasts exerting a marked differ-
the plants cultivated; on the east
find, for instance, Norfolk and
elebrated for their grain, in conse-
f its being a drier and more genial
re than on the west coast. Thus
hat the climate of our side of the
better adapted than the other for
ration of crops according to their
aracters, and this we find practically
case, as the one side of our country
ted for its grain, the other for its dairy produce and cattle, and also for its growth of grasses, the humidity of the air, from the greater rainfall, being more suitable for their development. Rye-grass, too, thrives best in loamy and the stronger classes of soils, such as we find generally in the counties of Somerset and Devon.

The preparation of the soil is another and very important thing towards the success of the crop and the conditions it meets with, favourable or otherwise, in the soil. We know no crop can thrive as it should unless this is attended to, and above all things keep the soil clean of weeds, which is always stealing the money from our pockets unheeded, by grasping the food from the crop intended to be fed. Now, I suppose you will say "shop," but if I tell you what I believe by practical experience to be the truth you must forgive me. This point is the selection of the seed; this has a particular bearing in the present case, as probably not one of the seeds we use in our ordinary crops is subject to the same amount of adulteration as the Italian, and also all low quality grass seeds. This is well-known to seedsmen and farmers, and of course reprehended by both, but practically supported by the latter, who too often look to the quantity rather than to the quality of the seed, and fancy that because it is offered them at a low price it must be cheap. It is true that by increasing the quantity of seed per acre they increase their chance of getting a plant, but at the same time it should be borne in mind that they also increase their crop of weeds; and it does not require much observation nor time to shew that bad seed is dear at any price. I have seen an analysis of rye-grass given in the *Agricultural Gazette*, and I think no one could have any idea of the number of weeds found mixed even with apparently pure samples; but, remember, I do not believe at all times this is from adulteration, but from the careless way in which many are grown and brought to market, not half cleaned, and retailed by the grower often to his own as well as to his neighbours' injury. It is often well to notice that the lighter samples of seed contain the greater number of weeds. This arises partly from the carelessness of its growth on the one hand, and the impossibility of cleaning mere chaffy stuff on the other; whereas the heavier samples of seed are more carefully grown, and the grains, being more plump and rounded, do not adhere to the weeds, and are more easily separated. This, I think, shews the great importance of a careful selection of seed, as, when weeds are sown as well, both are placed under exactly the same conditions, and as the latter are generally more vigorous in their habits and more hardy in their nature, a struggle for possession takes place, and the weakest goes to the wall.

The sainfoin crop is another of our best forage crops, and one I believe not half valued as it ought to be. This plant was introduced into France and called "French finger grass;" hence the common name French grass. In soils suitable for its growth no farmer can grow too much of it; it appears to have been long cultivated on the Continent before its introduction into this country, which was about a century and a half ago. The only two species cultivated in this country is the common and the giant. The common variety is that generally sown if required to remain down some years. The quality of the hay from this would be, I should say, rather superior to that made from the giant, although this latter is no doubt the more profitable to grow if not allowed to remain down more than two or at the longest three years. The soils best suited to its growth are those of a light, shallow kind, particularly those of a calcareous formation; in such it will probably give a more productive return than could be obtained from any of our cultivated plants. The soils containing large proportions of clay are unsuitable for its cultivation; but lands that are thin, chalky, and too close to the rock to carry ordinary crops of corn may be brought into profitable cultivation by being aid down to sainfoin for a course of years. The yield of the crop greatly depends upon the condition in which it is sustained; if continually mown and sometimes saved for seed, without any compensating manure being applied to it the plant will gradually become weaker, and the indigenous plants increase until they gradually stifle the and the land becomes filled with gr weeds; whereas, on the other hand plant is not allowed to stand too long being cut for hay, and the afters second growth be fed off with corn or a dressing with farm-yard mar applied during the winter, the cond the land will be kept up, the plants w vigorously, and the weeds will not ascendancy. As with rye-grass, so w foin — I say I have the best seed if apparently dear, is in reality the The seed grown in France, as a not to be depended on as that grown land, although a great quantity of it especially of the giant variety, to other seeds when the land is intended t two years. Good, fresh sainfoin seed sh plump, of a light grey colour outside, greenish tint inside; if of a very dark it has either been badly matured or jured in the stack, and is of an infer racter. I do not think it is advisabl a crop of seed except it be the l before being broken up, as the weeds a ripen as well, dropping their seeds an the land, thereby destroying the growth of the plant by consuming which would otherwise go towards velopment of the cultivated plant. a good plan to give the plant a good ing after the winter is over, which wil many of the annual weeds which ha tated on the surface. With these few I leave the subject in your hands, that a good discussion may arise. I h touched on a few of the leading pl tivated for the supply of food for ou The clover crop with its numerous may be classed among our artificial and would form a good subject to b on by some other member of this club future occasion.

THE DISCUSSION.

Mr W. **Chick** expressed his convictio cheapest and most advantageous plan c artificial grasses was to use none but the seeds that could be procured. The inferic contained a much larger proportion of the "tailing" and rubbish than was to be found in the good samples of seed. Speaking of sainfoin, he remarked that as his land at Owermoigne was suitable for this grass he should be sorry to be without it. He had recently broken up a piece of land that had been down to sainfoin for the last nine years, and the grass was almost as good now as formerly; it was only on account of the ground being full of bob and black grass that he was induced to break it up. His plan was to get a crop of hay from it first, then to hurdle it off for the sheep, which he supplied with a little cake in the autumn. He could not speak with such authority on the matter as some of the gentlemen around him, as he had only had four years' experience. He spoke highly in favour of Italian rye-grass, and, although he would not go so far as to say they could not possibly grow too much of it, yet every man ought to have a certain amount of it, particularly on good soils. With reference to rye-grasses, he much preferred the Devon or green rye to the white; they did not get so much in quantity, perhaps, but the quality was decidedly superior.

Mr D. STURDY inquired of Mr Scutt as to whether, in his opinion, the spring or autumn was the better time for sowing rye-grasses.

Mr W. BUDDEN agreed with Mr Chick that the green rye was preferable to white when they were going to have a two-years' lay; but the white variety would do equally as well for one year. He had very little to do, however, with either the white or green varieties, for he had discovered since he had sown Italian rye-grass that it paid him double and treble as much as the other, especially the foreign sort; in fact, he would not sow English seeds if any one were to make him a present of a lot. He related an instance of sowing some of Pacey's green rye in the midst of a piece of Italian. The result was that the latter had grown much more luxuriantly and would produce double the crop of the other. It might be argued that the green rye produced hay of better quality, but he did not think this could be proved—that was, if the Italian was cut soon enough and not allowed to grow sticky. He had cut Italian rye-grass mixed with clover, and found the sheep had done better than ever before. If they had green rye they invariably had to let it stay too long, in order to get the clover out in flower. That was disadvantageous; and he found Italian rye-grass could be produced more easily and profitably with the broad clover. He recollected a few years ago sowing some Italian rye-grass from seed that had been grown in the locality for one year; but the seed did not produce half the quantity as from the foreign seed. He had two sacks to try, and the difference in the crops could be seen from a long distance—in fact, when the judges came over last year to inspect his roots they immediately detected the inferior patch in the field, and asked him what it meant. He then informed them that was a piece sown with English seed collected for the first year's crop. They advised him if such was the case not to sow any more English seed, and he had followed their recommendation. The system of sowing depended much upon the season. Sometimes, if sown in the spring, the crop is more forward, but at other times it was just as well as to sow after the barley or wheat was carried. He recollected seeing some Italian rye that had been sown after barley cutting at Cerne, and before Christmas it was as high as his ankles, when walking through it. He could not have believed it if he had not seen it.

Mr T. C. SAUNDERS—How was it sown?

Mr BUDDEN—It was harrowed into the stubble just as you would sow trifolium seed. The ground was not ploughed.

Mr T. C. SAUNDERS said if a farmer hoped to keep his land clean it was essential that he should be particular in selecting the very best seeds. Like his friend Mr Chick, he preferred the Devon to the white rye; indeed, he had not sown any of the latter description on his farm for many years, and he saw no reason why he should go back to it. Italian rye-grass was very useful, but it was frequently found that the seed was very foul. He considered the foreign seed was far preferable, and, from the change of climate and soil, it answered far better than the English seed. One drawback was that Italian rye-grass seed contained so much couch; although it was scarcely perceptible it caused much trouble for two or three years to clean the land. Therefore, when he purchased Italian rye-grass seed he was particular in cleansing it as effectually as possible. He did not think, however, there was so much adulteration of this kind in the foreign as there was in the English seeds. His own experience taught him it was advisable to let the sainfoin stand until it reached a certain stage before cutting, for having cut a portion of the crop early he found the plants bled, and there was always a marked difference between it and the remainder of the piece which had been allowed to remain some time longer. If they allowed sainfoin to attain a certain degree of ripeness it turned out better in the end, and the plants were not apt to bleed. Giant sainfoin did not foul the land as much as the other sort, and he did not object to have a portion of a field sown with it, to come in with the common sort. He could not go so far as some previous speakers with respect to the superiority of foreign seed, but the best he could get, in his opinion, was direct from a well-known respectable grower in Hampshire.

Mr SCUTT.—Then you won't trust to the seedsmen?

Mr SAUNDERS.—Well, I don't like the foreign seeds.

Mr READER agreed with Mr Scutt in his remarks respecting the green and white rye, and the better they could get the green rye seed, the more profitable it was to the grower. A good green rye was undoubtedly a great benefit to the farmer, but the inferior seeds contained a large proportion of extraneous matter. He had not sown white rye on his farm now for many years. Demurring to the statement set forth in the paper relative to the weight of the Italian rye-grass, he recollected when it was first introduced into this country, some twenty-five years ago, the prevailing opinion was that it should not weigh more than 12 lb. per bushel; but he considered the heavier they could get a good Italian rye the better. One year he saved some himself, and thrashed it in the fall of the year, putting away a certain quantity to sow in the spring. He put it aside, however, and when the spring came he could not find it, and he was obliged to sow some "tailing" in one part of the field. The result convinced him that the lighter seed was the best, for his "tailing" produced as good a crop as if he had procured foreign seed. In a field close by, where the "best seed" was sown, the plants went back like the common Italians; it did not grow so fast as his "tailing" seed did. That convinced him that the opinion which prevailed when the grass was first introduced into the country was a correct one. If they sowed Italian rye-grass, in five or six years it would get as heavy almost as the English sort. They were all very well aware that he did not mix his rye-grass with his broad clovers; he believed it was a very bad plan. When he sowed his clovers, instead of sowing them once in four or five years he sowed once only in nine years, and varied the cropping with Italian or Devon ryes, hop, Dutch, and so forth. If this plan were generally adopted much better broad clovers would be produced than by sowing them every "round." The land often became clover-sick because it was sown too often with that plant; the land required longer time to rest, and he felt convinced, by the nine-years' system the crop would yield half as much again than when sown every four years. A certain quantity of sainfoin should be sown on all farms; but he did not recommend them to go too deeply into it. If land was sown down to sainfoin for five years they could not sow the same plant again with any advantage for twenty years afterwards. He had two or three pieces of land with rocky chalky soil well adapted for sainfoin, and here he had grown very good crops indeed for four or five years. This had been broken up afterwards and sown to corn and other grasses for fourteen years; but on sowing sainfoin again after the lapse of that time it had not stayed more than two or three years in the ground, whereas formerly it had stood from eight to ten years, if he chose to let it remain so long. With respect to giant sainfoin, a certain portion of it was very useful; but a mistake was often committed by not sowing it thickly enough. People said if they sowed a sack per acre it was sufficient; but he had never found 6 bushels too much. They heard people complain that the giant sainfoin grew too coarse. But why was that? Because it was not sown sufficiently thick. If any of those present were in the habit of sowing it, he recommended them to cut it early in the first crop and save the second for seed, the same as with broad clover. They would thus get a good amount of feed, and they would obtain more the second cropping than from the first. proved this at different times. On all la there was a poor subsoil sainfoin could be vantageously; but it was useless to sow it clays or on sand. It required a dry porous that the roots might penetrate to some recollected an instance where the roots of had descended 6 or 7 feet into the ground.

Mr C. Besent thought he could confirm had fallen from previous speakers, though he of throwing much additional light upon t which had been treated in such an exhausti by Mr Scutt. With regard to Italian rye believed it was a great advantage to the cou that plant was introduced. He thought he seen more of this grass about the country t the present season, especially in the neig where he resided. There could be no d little judicious care must be exercised in th of this seed, the same as with clover and o It was only feasible to conclude that the seed they put into the ground, the better c had of reaping a good crop. As to what had said, he (the speaker) considered it plan to sow only once in nine years, and they got only an indifferent crop by sowing If they varied the seeds and left their lan occasionally, they would have a chance of better crops than at present. He also thou the farmer well to have a little dressing put upon the land, and very frequently the to take away the properties of the soil with ing it by the aid of manures.

The Chairman (Mr Bates) said—The had been under discussion that evening ha ranged in their lucrative and beneficial varying from three years up to twelve years' experience. It was not many could give them the benefit of twelve years' experience on a crop, and that which specially to mention—the sainfoin crops. most important subject in their district. of those crops they found lying upon a chal and it was very important to a farmer large quantity of stock, because it render mense amount of food, and it was of the g portance to know how long it was capabl sustained to the advantage of the farmer; ever, could only be learnt by experience.

Mr Scutt, in reply to Mr Sturdy's que the best time to sow Italian rye-grass, migl that he sowed his with broad clover; t would not do to put it in till the spring of th he had occasionally sown rape and Italian fall, and it answered remarkably well. W to sowing in barley land, he put rye and clove and sowed them the same as green or whit must depend altogether upon circumstances h managed. He thought most gentlemen had a him in the opinion that Italian rye was more profitable to grow than any other grass. Mr Reader had made a remark with regard to the weight of the seed. He (Mr Scutt) thought it must be borne in mind that the heavier seed, as a rule, had not such a bad character as the lighter ones had. When they sowed lighter seeds they must get only a medium quality, and having so much "tailing" with it, the inferior seed was indeed heavier than the better sorts; besides, they could not clear the lighter seeds as they could the heavier, and consequently they must, as a rule, sow more weeds with the former. He agreed with Mr Saunders that in the case of sainfoin the plant was strengthened by being allowed to remain a proper time before cutting; at the same time, if there were any weeds, they dropped their seeds into the land, and proved an injury to the succeeding crop. He could understand the feasibility of Mr Reader's statement that 6 bushels of giant sainfoin seed per acre were not too much, because the seed was larger than the common sort. In all these matters he was an advocate for top-dressing; there could not be a doubt that it always paid the best, in the end, to keep the land well supplied with manure.

RYE-GRASS SEEDS AND WEEDS.

THROUGHOUT the two centuries which have elapsed since rye-grass was first subjected to cultivation, impurity, or a mixture in its seeds of those of injurious weeds, has always been a standing accusation on the part of purchasers against both seedsmen and seed-growers, and that, it must be admitted, not without some reason. For the presence of such weed seeds, buyers themselves may be held fully as blameable as sellers, from the too prevalent notion that a small saving in the price more than compensates for either foulness or inferiority in the seed sample. In the early history of rye-grass cultivation, a very common argument against its growth was, that along with it were unavoidably sown the seeds of knot-grass, couch-grass, bent-grasses, goose-grass, Yorkshire-fog, sheep-sorrel, horse-daisies, self-heal, and most of the other field-weeds; the presence of which might have been more correctly ascribed to bad farming than to seed foulness. It was then a very common practice to sow grass seeds collected indiscriminately from hay-lofts, where they had not only been shaken out of clover and rye-grass hay, but also out of meadow or natural grass hay, as well as from among corn straw; in all of which the weeds complained of were, with their ripened seeds, more or less present.

Purity of seed, however, is now deemed so essential that not only must seed growers be much more careful in the management of their crops, but seed merchants are under the further necessity of employing the best mechanical appliances which can be had, for taking out all extraneous seeds, whether hurtful or harmless, which interfere with the apparent purity of their seed stocks. It is remarkable with how little discriminating knowledge many farmers examine rye-grass seed samples, before making their purchases and how much importance they not unfrequently attach to the presence of seeds which, after all, are next to, if not entirely harmless; while they overlook others, the presence of which in grass fields are both unprofitable and unsightly. Thus we have seen a highly intelligent and successful farme so puzzled and alarmed at the presence o unripe seed-pods of common yellow clove among a sample of excellent home-grown rye-grass seed, that he had resolved not to sow the latter at all, till he fell in with "one with an eye to business," who agreed to dres it with his seed-cleaning machine for a stipulated remuneration, superadding the pro viso that when so cleaned, the seed might be reduced fully one-half in bulk; whereas, had dock-seed in this instance been present, in stead of that of immature, and consequently non-vegetating, yellow clover, in even sufficient quantity to produce a single plant to 10 square yards, in all likelihood it would have had little chance of being detected although the docks, unless weeded out a considerable expense, would have disfigured the entire crop, as well as disgraced its owner.

Of the weeds which are sometimes blamed for being introduced with the rye-grass seed, we may here remark that such a result is next to impossible with the knot-grass (Arrhenatherum avenaceum bulbosum), the couch-grass (Triticum repens), the common and the corn bent grasses (Agrostis vulgaris and A. v. segetus), horse daisies (Pyrethrum inodorum) and its allies; and self-heal (Prunella vulgaris). The first only commences to flower when the rye-grass seed is ripe, so that both cannot be reaped with matured seeds together; and even if its seeds were actually among those of the latter, their presence would be easily detected by their somewhat larger size, lighter weight, more rounded or oat-like form, and especially by the presence of a downy tuft at the base, and a prominent dorsal awn proceeding from below the middle of each seed. In regard to the common couch grass, although its seed more resembles that of rye-grass than the last, and complaints of its presence are still more frequent, it, like many other creeping-rooted plants, produces comparatively few fertile seeds. Indeed, so seldom are they perfected that we have searched over large districts of the country without being able to find more than a dozen perfectly matured seeds in a season. The bent grasses are also much later than the rye-grass in ripening their seeds, and these are so minute as to admit of being either sifted or blown out with the greatest ease. The seeds of horse daisies are neither much larger nor less easily cleaned out than the last; while those of the self-heal are heavy and roundish, somewhat similar to clover seeds, so that if present, they would be easily sifted out; but the plants on which they grow are so dwarf that few or none of their tops can be harvested with the rye-grass.

The following are the principal seeds which are held to be objectionable when present among those of rye-grass, viz. :—

The Downy and Smooth-seeded Field Brom^. *or Goose Grasses* (Bromus mollis, fig. 1, and B. pratensis), the seeds of which, as well as of some other less common species, are pretty similar in size and form; but those of the first, which are the most frequent, are always recognizable by their downy covering.

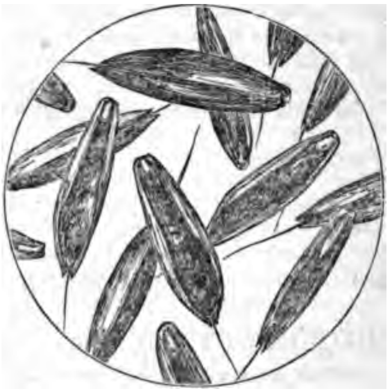


Fig. 1.—Seeds of Bromus mollis—magnified.

When in ear, these brome-grasses impart a coarse, unsightly appearance to the crop; and they are equally objectionable in the hay, detracting from its value as well as from its nutritive properties, the B. mollis being, according to Professor Way's analysis, one of the least nutritious of common grasses at the time of its flowering; although some asser that it is less so when its heavy, somewha corn-like seeds are fully matured. These no only differ from those of the common rye-grass in being both larger and heavier, but they are further easily distinguished by being

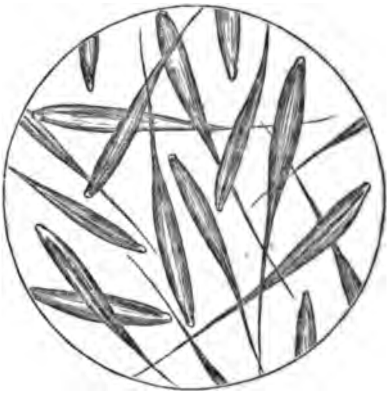


Fig. 2.—Festuca bromoides—magnified.

rtly awned, and more triangular in form, ich latter "wide-breasted" characteristic is, vever, less evident in the young than in the y developed seeds, as shewn in the ac-npanying engraving, in which the narrowest ds are not fully matured.

The Hair-seed Grass—(Festuca bromoides some authors, and the Vulpia bromoides others)—of which botanists reckon two mmon varieties, the F. b. nana, and F. pseudo-Myurus, which differ chiefly in their e. Both yield the objectionable hair-seed, 2, but it most frequently belongs to the t-named, which is considerably taller, as ll as more lax and leafy in growth, than other, attaining under favourable circum-nces to a height of from 12 to 15 inches. th grow naturally on dry, light soils. They frequently so abundantly indigenous, that ir seeds often appear in large quantities ong those of the rye-grass. Being easily tected, even by the most superficial ob-ver, they are by many looked upon as pable of producing nothing less than the ongest growing and most noxious kinds couch and brome grasses, whereas, on the ntrary, they result in nothing more than all, harmless, unobtrusive plants, even if y grow at all, which they so seldom do, in at may be termed good wheat soils, that we ve often searched grass fields throughout le districts, without being able to get as ch as a single specimen; and only found ew plants on quarry *debris*, and similar dry well as unfertile places. Such, however, the hatred manifested against its seed by mers, that the principal seed merchants ve to erect machinery expressly for ir extraction, by which they become ners, not only from the enhanced prices ich they receive for the clean seed, but ne make a further profit in selling the r-seed cleanings to foreign houses, who, is feared, do not hesitate in employing m for the adulteration of Italian rye-grass, ferent kinds of Fescue seeds, and those of er valuable natural grasses. A little prac-will, however, enable any one to detect m among other grass seeds, even without croscopic aid.

The Silvery Hair-Grass (Aira caryophyllea).—On reference to fig. 3, the seeds of this will be seen to bear no inconsiderable resemblance in form to oats, while in colour they closely approach to that of the well-known black Tartarian oat, only they are so remarkably small that their form is scarcely ascertainable without the aid of a pocket microscope. This is one of the dwarfest, prettiest, and shortest lived of the hair-grasses, and although by no means uncommon on old wall tops and bare sandy or stony places, growing from 3 to 8 inches in height, it seldom appears in arable fields, except in such dry gravelly soils as seem to have once formed the beds or borders of mountain lakes and streams, where it not unfrequently attains to heights of from 12 to 15 inches. In such lands we have seen it abundantly associated with rye-grass, where, however, rye-grass seed is but little grown, except for the supply of local demand. Consequently, the silvery hair-grass seed is not generally seen in rye-grass samples, or even known by seed dealers; but being, when present, conspicuous by the blackness of its colour, it is looked upon with suspicion by many who are unacquainted with its appearance, although it is one of the most harmless of weeds, and incapable of germinating, or at least of maintaining an existence in soils of even moderately substantial texture and ordinary fertility.

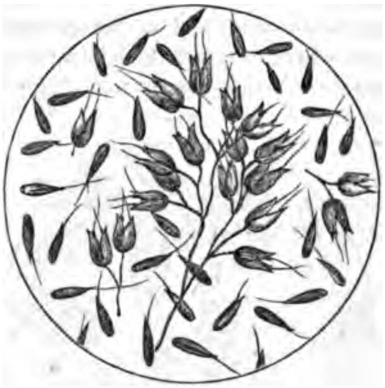


Fig. 3.—Aira caryophyllea—clean seeds, branch, and spikelets—magnified.

The Woolly Soft Grass, Yorkshire Fog,

White Grass, or Cockstail Grass (Holcus lanatus), is everywhere common, but more especially so on upland lightish soils, improved moorlands, and in the generality of districts where rye-grass seed is most largely grown. Although occasionally sown on ground which is incapable of carrying better classes of herbage, the Yorkshire fog, as it is most frequently termed, is justly looked upon as a pernicious weed in all good grass lands, from its tendency to displace the finer and more valuable kinds, as well as from its unsightly appearance, and its deficiency in nutritive properties. Hence, the presence of its seeds among those of rye-grass is usually deemed highly objectionable. In their ordinary state, however (fig. 4), they are easily taken out by seed-cleaning m nery; but as an opinion is held by some their presence in small quantities is co sive proof that the rye-grass seed has saved from two-year-old grass, and ther that it must be what is termed perei allowing a little dash of the Holcus see remain, and a slight introduction of it ai samples which were previously clear of sometimes found to be advantageou: insuring sales at higher prices. York fog cleanings are the cheapest of all ; seeds; and if only sold for sowing o ferior soils, as before mentioned, little would be done. But a highly repreher fraud is sometimes practised, by sepai the clean seed (fig. 5) from the chaff, mixing it, in greater or less proport with the crested dogstail grass (Cyno cristatus) (fig. 6), which, being chiefly for sowing down ornamental lawns and greens, render them very unsightly, and for the purposes for which they wer tended.

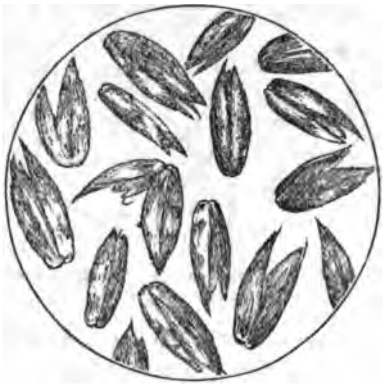


Fig. 4.—Holcus lanatus—magnified.

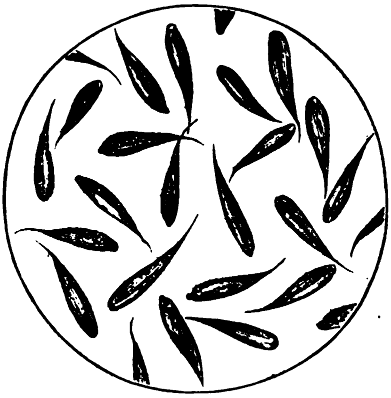


Fig. 5.—Seeds of Holcus lanatus in their "prepared" state—magnified.

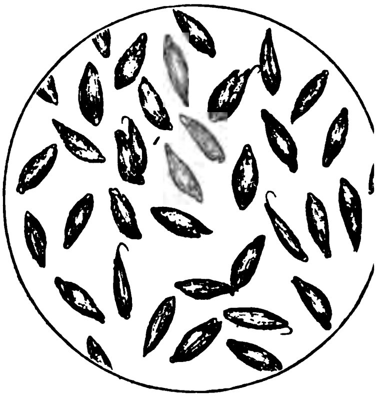
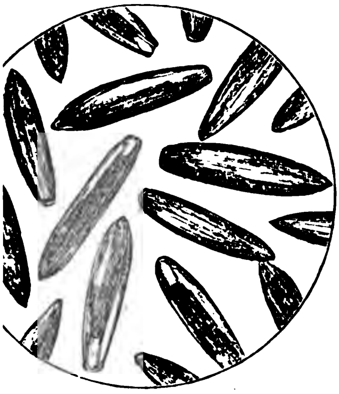


Fig. 6.—Cynosurus cristatus—magnified.

The Curled-leaved, the Broad-leaved, the Fiddle Docks (Rumex crispus, R. o folius, and R. pulcher) are what ma termed the true docks, which are most monly found in cultivated grass lands; that any of their seeds should be pr among those of rye-grass, shews unpardoi carelessness or negligence on the part of the growers; nevertheless, such is too frequ the case. If it is considered that c aird freely in all soils, that the lants are not liable to injury from slugs, or other causes, and that a tively thin scattering of plants dis- field, it must be evident that ecaution should be taken against nything to do with grass seed in at of these or any other docks are

Most seedsmen and farmers are vith the appearance of dock seeds; ey fail of detecting them in the brown sks which they may discover among ds, they have only to extract from the bright, coppery-coloured, tri- -formed seed, which unmistakably ts parentage and family relation-

ieep's Sorrel (Rumex acetosella) is the ublesome weed belonging to the r sorrel-docks, and being naturally t in light poorish soils, its seeds are ans unfrequent among those of rye- They are much smaller than those of docks, but when rubbed out of the ey also exhibit the coppery colour ngular appearance peculiar to the genus. Little danger exists of 's sorrel ever becoming too abund- od arable soils; but whether for hree years' pasture or permanent ll descriptions of inferior light soils they spread rapidly when once introduced, displacing by their worthless herbage that of better plants, and disfiguring the turf by their unsightly presence. Its seeds should, therefore, not be less carefully excluded from those of rye-grasses than the seeds of the true docks, especially when intended to stand for more than one year on light or even medium soils.



7.—Common Rye-grass—magnified.

The engravings of common rye-grass seed (fig. 7), and of that of the Italian rye-grass (fig. 8), are magnified on a similar scale with the others, so as to facilitate comparison, and enable readers to judge of the respective appearances presented by them and their weed-seeds.

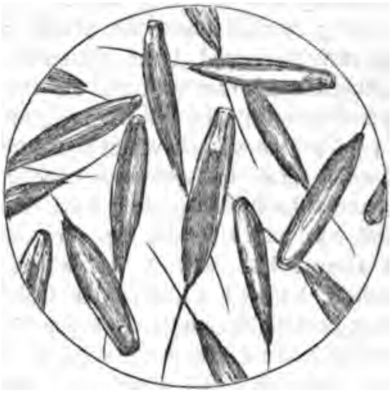


Fig 8.—Italian Rye-grass—magnified.

From the preceding remarks, it will appear evident that the more seedsmen, as well as seed purchasers, know of the true natures of the plants produced by those *weed-seeds* which are most frequent among those of rye-grass, they will not only be the better able to distinguish between the hurtful and the harmless seeds, but also avoid those causeless misunderstandings and litigations which too often arise. Ability to distinguish these seeds might be easily acquired by the use of nothing more expensive or formidable than a pocket microscope for examining, and thus familiarise the eye with seeds of all kinds during leisure field wanderings.—*From No.* 2 *of the Seedsman and Nurseryman.*

RYE, RAPE, ETC., FOR GREEN CUTTING.

LAST harvest being with us uncommonly early, I thought it was worth a trial whether, between 1st September and 1st June, it were possible to grow a crop of some sort which would save our cutting grass, and enable us to keep on for a longer period our winter stock of young cattle. I had a field of 7 Scotch acres of wheat which, being early harvested, I thought suitable for the experiment. Our rotation on the field in question is one of seven—1st, hay; 2d, oats; 3d, potatoes; 4th, wheat; 5th turnips; 6th, wheat; 7th, barley—sown out for hay. The land is hard, strong black land, on a dry subsoil, and with southern exposure, and the crop reaped last harvest was wheat after potatoes. I sowed a mixture, of which the following are the constituents for each (Scotch) acre:—3 bushels rye, 8 lb. rape, 1 bushel Italian rye-grass, and about ¼ bushel of winter tares. After the wheat was off the ground, the land got a moderate furrow, and was sown with the mixture by a broadcast sowing machine, harrowed, and rolled smooth; no dung or manure of any kind was given. This was completed during the second week of September. By the middle of October the braird was mistaken by casual passers-by for a too forward crop of wheat. During all the winter it looked fresh, the rye especially seeming to stand the frost very well. So soon as the warm days and cold nights of February came, the rape seemed to get sickly, while the other three got on their legs and made rapid progress. Early in April I applied about 3 cwt. of James Scott & Co.'s (Granton) grass manure to about 1 acre of my field for early cutting, with good effect. By the 1st of May, my turnips being exhausted, I began to cut. The rye was the principal item; the tares were strong, but I had sown so few of them they were little known. The Italian rye-grass was a thick undergrowth, hough a little sickly-looking, and the rape was scarcely visible. Off the 7 Scotch acres we have got about ninety heaped horse cart-loads of green food, which
to keep a stock of about forty two-y
and fifteen one-year-old cattle for the
month of May, their only other food
the time being a few potatoes and a
chaff and oat-straw as they could co
which was not much. The cattle we
of the food, and did as well on it as
best pasture.

Immediately on an acre of the
being cleared, it was ploughed, harrow
rolled. On the whole being cleared
cross-ploughed and rolled, grubbed,
have before said it was strong land, a
will be manifest when I say we hav
obliged again to plough the field, th
amount of grubbing, rolling, and ha
having so beaten it as to make the
of the furrow very hard. The stubl
to be gathered by the hand. Howev
we have got a good and kindly mo
are ready to drill and sow white
applying about 35 tons of mixed to
farm-yard manure, and 5 cwt. of a
of Peruvian guano and dissolved bo
acre. The wheat was not dunged,
previous potatoes were, and, conside
extra crop that has been taken, the
of manure is not more liberal than
is requisite to ensure good turnips.

I may further remark that by the
ning of May "the bloom is on the ry
by the third week we had it in full ea
cattle were fond of it in every stage,
not able to consume so much of it
the end of May, which has proved a
month.

The manure produced by the food
very superior description, and the one
potatoes a day, which the cattle got w
suming the rye, seemed to keep thei
in good order, especially towards the

The success of my experiment will
proved till I see a good crop of tur

the field, but I will let you know. Meantime, should weather prove favourable, I see nothing in the nature of my operations to prevent a good crop.

To use the rye, &c., to best advantage, I think it should be cut and mixed with chaff, oil-cake, &c., and when I try it next, I will give manure in autumn, and the mixture I will sow will be for the Scotch acre—3 bushels of rye, 1 bushel Italian rye-grass, and 1 bushel winter tares. I will discard the rape, and will hope that the manure will both give me a better and earlier crop.—*David S. Salmond, Mains of Errol, Perth.*

THE FLESH AND FATTENING OF STOCK.

DISADVANTAGE OF KEEPING YOUNG STOCK DURING THE PERIOD OF THEIR GROWTH IN LOW CONDITION.

THE quantity of muscle which can be on the body of an animal is limited by its skeleton, or frame of bone. The muscles which lie along the back, for instance, can only fill the cavity between the pens or spinal processes of the back and the upper part of the ribs; and the muscles of the limbs and other parts of the body will be in proportion thereto. The volume of muscle may be very greatly diminished by starvation, or by the illness of an animal; by which the lean portion will be in an unduly deficient proportion to the fat in the flesh of the fattened animal. In the rearing of cattle it is a very usual practice to keep young animals, particularly during the second year of their existence, in very low condition, on very inferior pasture, or innutritive provender, by which the volume of muscle becomes greatly reduced. This is a most flagrant error in the practice of rearing stock, as a young animal so treated will never be a good subject for being fattened. Under such circumstances, the flesh, when fattened, will be in deficient proportion of lean to fat; and the beef will thereby prove not only to be uneconomical, but far from being otherwise desirable by consumers. In the north-east of Scotland—particularly in the contiguous shires of Forfar, Kincardine, Aberdeen, Banff, and Moray—where the feeding of cattle is the most important branch of husbandry, and is practised with the greatest success in the production of fat cattle, of an excellence of quality unrivalled in any other district of the United Kingdom, the farmers are fully alive to the very great importance and great advantage of having the cattle intended for being fattened kept in good condition from the earliest period of their existence until the process of fattening is completed; and it is to such a mode of proceeding that much o the extraordinary excellence of their fat cattle is due. The fault of a deficiency of lean arising from inferior keep during the growth of the animals, is seldom the case with the beef of cattle fed in the district of Scotland referred to.

QUALITY OF BEEF, AND ITS INDICATIONS IN THE LIVING ANIMAL.

When the side of the carcase of a completely fattened ox or heifer is cut through in being divided into quarters, the cells of the cellular tissue, not only between and covering the muscles, but also between the bundles o fibres composing muscles, will be found to be completely filled with fat; and the cross section of the beef will present an alternation o lean and fat, and the muscles will have the mottling or marbling of fat which butchers point out to their customers with so much pride and satisfaction, especially on the approach of the festive season of Christmas. The evil already spoken of as to an undue proportion of fat to the lean of meat, arising from a low condition of the animal during its growth, is on many occasions greatly aggravated by the feeding process being continued

after the cellular tissue of the flesh having become completely filled with fat, especially when such feeding has been continued after the animal has reached its adult maturity. Under the last-mentioned circumstances, a portion of the fibres of the muscles become converted into fat; and the author of the present article has on several occasions noticed the conversion in question to have reached an extent that the boundary between the original space occupied by muscle and the fat contained in the adjacent cellular tissue, to have become completely undistinguishable. This conversion of fibre into fat may frequently be seen in the muscles of the ventricles of the heart of over-fattened animals, in which cases heart disease had taken place to such an extent that instant death might have resulted from almost any exertion. The conversion of muscle into fat described is not, however, always produced by over-feeding, or it is confined to old animals, but it, and a deposit of fat on one or both kidneys to a most extraordinary extent, are often to be met with in both cattle and sheep as a freak of nature. The attention of the writer was lately directed to a most remarkable case of conversion of muscle into fat in the beef of a moderately fat heifer of little more than two years old, of a carcase weight of 44 stones of beef of very good quality, in which the principal muscle of the back, extending over the eighth, ninth, tenth, and eleventh ribs on the off side of the animal, was completely converted into fatty matter; and the parts of the muscle between which the conversion had taken place were connected by tendons. Another state of fatness of meat yet remains to be noticed. The state referred to is when the cells of the cellular tissue of the flesh are fully expanded and filled with a semi-fluid, or rather a gelatinous matter, resembling in appearance and consistence the imperfect glue or sizing matter used by painters in preparing wood-work for being painted upon. This state arises from the fattening process of an animal of great aptitude for becoming fat not having been continued for a sufficient length of time for the fat to become a solid substance. An animal in the state described, although it may
the bulk of one completely fatter
weight will be greatly deficient. Hav
cells in which the fat is deposited
body filled with imperfectly-formed fa
an animal may be considered to b
apparently—not really—fat. On h
such an animal, when alive, the feel
substance of its body to the hand
loose, soft, and flabby, and will con
impression of there being fluid matter
fact there is—under the skin. In
cooked, the flesh of an animal in the
tion spoken of, great waste is certain
place, and it will be avoided by tho
are judges of meat, and that in wh
fattening process has been more p
completed will be preferred.

An objectionable quality of fat, an
sive and also an incomplete state of
in beef, have been subjects of notice
foregoing remarks; it is, in the next
intended to treat of a standard excell
quality in fat beef, and to describe its
tions in the living animal.

When the beef of fat cattle is of t
quality, the lean portion will be, thr
the whole carcase, as ample in its vo
the frame of the animal will admit
muscles will be a deep and bright r
the fibres of the same will be fill
juice of a bright clarety red colour;
fat of the beef of a thoroughly fattene
heifer will completely fill the cells
whole of the cellular tissue through
body of the animal. Fat of the best
will be firm and solid in its consisten
wax like in its appearance and feel—
removed from being either soft and
or friable and dry—and it will be of
clean, and bright buff hue, or that o
when produced from the best dairy
in the height of summer. A dark
approaching to orange, and a
colour, are both objectionable in
of beef. The former-mentioned
ance in the fat indicates gross
quality of the beef, most frequently,
tainly not invariably, the result of th
of oil-cake from the use of too great

feeding of the animal; and the
ioned appearance indicates, on the
, a want of richness in the quality
, arising, most frequently, from a
onstitution rather than the effect
rticular diet of the animal in the
being fattened. Whiteness of the
it should be remarked, is always
with friability and dryness of its
e.

ne remarks as those above in re-
eef, will, with slight exceptions,
to mutton and pork. The quantity
utton in proportion to the carcase
ughly fattened sheep is generally
n the proportion of fat to the car-
ef; the fat of mutton is naturally
it is harder than the fat of beef.
pork is in greater proportion to
carcase than the same comparison
; it should be white, and it is softer
t of beef.

he flesh of veal, lamb, and young
es not require any remark, except
onsumption of the flesh of these
food is very uneconomical, and
the prosperity of this country is
consideration, especially under the
ircumstance of dependence on
oduction for a large portion of the
f the animal food of the British
to be discouraged.

n and the fat of its flesh are very
e distinguished from each other in
animal. The muscles, or lean
f the flesh, are the means by which
communicated to the limbs and
the animals; and when a limb or
is in motion, the action of the
producing such motion can be im-
felt in handling the animal. The
other hand, is devoid of all motion,
pressed upon by the hand, feels
or cushion of inert matter under
The fat on a thoroughly fattened
eifer covers the surface of the
nk of the body of the animal,
front of its shoulders to the
extremity of its rump. This cover of fat includes a collar of fat around the lower part of the neck and in front of the shoulder forwards, and a protuberance of fat on the naches on each side of the tail backwards. Between the elbow and the knee in the fore-legs, and between the stifle-joint and the hock in the hind-legs, are the only parts of the body of the animal which may not be covered with fat; and the covering of the fat in question lies immediately between the surface of the trunk of the body and the hide, except on the sides, the belly, and the posterior part of the shoulders, which are the parts of body that cannot be reached by either the tail or the head of the animal. A thin layer of muscle is interposed between the fat covering the principal muscles of the body and the hide, to produce a violent motion in the hide to dislodge any insects that may alight on the parts of the body on which the sub-cutaneous muscle spoken of is placed, and which may occasion annoyance to the animal. When a beast is thoroughly fattened, the hide will be so distended and filled with the fat deposited under it, as not to be capable of being laid hold of by the finger and thumb and raised from the body, and the fat will resist the pressure of the hand with the firmness of a deal board. The description last given is in great contrast to the loose and semi-fluid feel of the fat, or the apparently fat, or incompletely fattened, animals which frequently find their way to Christmas shows and markets for fat stock. Animals in the first of the two above-mentioned states will have a great advantage in their carcase weight for their bulk, and also in the superior quality of their beef, to those in the latter-mentioned condition. Beyond the condition of animals as just described, nothing further of the quality of their flesh can possibly be ascertained by any examination of the beast alive; but firmness of fat, and an ample volume or substance of lyer or muscle, will always be a sure indication of a good weight of carcase, and also for a good quality of beef.

LONK AND HERDWICK SHEEP.

THE derivation of the name "Lonk" is obvious enough, an evident abbreviation of "Lonkashire," as Lancashire was formerly spelt; that the name of "Herdwick," somewhat obscure, is said to be derived from a practice, which we shall presently describe more particularly, of letting, with the land, the flock or *herd* of sheep upon it—an unusual use of the term "herd," but one which is understood to be not uncommon in the Herdwick district. We do not, however, ask the reader to attach much importance to this suggestion as to the origin of the word (which is at the best unsatisfactory), although it is the only one we have met with in works upon the agriculture of that part of the country which owns the breed as indigenous. Whatever be the sources of their names, the origin of both breeds represented by those names is uncertain. Tradition, indeed, asserts that the Herdwicks are descended from a few sheep washed ashore from the wreck of a Spanish vessel some centuries ago. Concerning the Lonks we have neither record nor tradition to guide us in surmises regarding their early ancestors. Probably the "natural selection" traceable in circumstances which destroyed the weaklings of antient flocks, inured the survivors to uncommon hardships, and created in succeeding generations hereditary properties necessary in the struggle for life, has in the course of ages worked in concert with man's repeated acts of selection, producing the result we see—a race of animals fitted both for the country and for the use of mankind.

Improvement in a breed thus produced and constituted is not to be sought through the introduction of elements from without. The laws which we suppose to have been effective in forming and fixing the type, must be held in view by the breeder who would still advance. *Crossing* with other varieties has signally failed, when the object was to obtain an improved animal for the mountains or the fells. In connexion with this part of the subject some interesting experiments are related by Mr Peel, of Knowlmere Manor, whose experience as a breeder of Lonk sheep was sketched in an excellent article published two or three years ago. "It seemed so easy and so natural," we are told, "to correct their faults and make good their shortcomings, by crossing them with sheep possessing those good gifts which nature had denied to them." Mr Peel proceeds to state that a portion of his flock of Lonks was crossed with the Southdown, with the intention of returning the produce to the Lonk ram; but both this experiment and one of a cross with the Shropshire Down, though fairly tried to the utmost, proved complete failures; fully confirming, Mr Peel says, by his own "dire experience," Mr Rowlandson's opinion concerning the impossibility of successfully crossing
th sheep with a view to the improvement of the
progeney as heath sheep only. If certa
of form had been secured, everything w
breed its pre-eminence in the distri
Stunted and tender offspring, incapabl
the wool necessary as a defence agains
in that climate, was the result of each
Down. Renewed efforts, therefore, wer
improvement of the breed by a judicio
materials which it afforded. "The att
row a little fat from the lowlander"
Mr Peel perceived that "the fat, if mad
needs be made at home;" and he accor
his attention to the means of making it at
whole Lonk district was yearly searchec
rams of the purest and best blood, anc
size that could be obtained, in union
form and quality; and the purchases
without limitation as to price, with refe
rection of deficiencies in the flock. Si
cured in numbers sufficient to admit o
picked breeding ewes having, if neces
specially assigned to her. The characte
individual were carefully considered,
animals apparently best suited to one
brought together for breeding purposes.

While the desired improvement was
but sure progress, a happy accident
reach an animal possessing in extraordi
ment the very qualities which Mr Peel
ably striving to bring out in his floc
crossing the farm of a Lonk breeder fa
sheep, he saw a magnificent ram—"
qualities rarely found in combination, larg
admirable in symmetry, wide in the loin,
throughout, but deep in the chest—that
a mountain sheep—his breast rivalli
bounteous bosom of a first-class Warla
with a splendid head, from which gre
measured some 41 inches from the base
"clothed with coat of long fine wool."
to secure an animal so thoroughly suite
pose, Mr Peel sent his bailiff with directi
him; get him for as little as you can, b
and the ram, to which the name of M
was given, was presently transferred to
a price that seemed in those days a ve
His "coat of long fine wool," we are t
reached, throughout his whole length,
measured inches from the ground, and
18 lb.

The mark put upon the flock by t
extraordinary, but may be accounted
grounds besides the peculiar hereditary
undoubtedly belonged to him. The pr
breeder who has studied the principles in
success of his business, will perceive in

ewes had been carefully selected and bred
w to the very type represented in the person
iin King, a strong reason why the Knowl-
: might be expected to take readily the im-
is character. Their parents and ancestors
ssed severally all the qualities which *he*
in combination. His influence, therefore,
y elements to work upon, and no formidable
n to overcome. In the satisfactory result
ain King's services, Mr Peel received the
ot only of his judgment exercised in the
that one sire, but also of the pains he had
r taken in breeding up to his ideal type of a
y good Lonk sheep.

inciple of adhering to purity of breeds is as
served by the Lake district farmers as by the
; of the Lonks. The breeding flocks of
s are kept as free from strange alliances as
of Arabia, or high-caste Hindoos. If cross-
ll admitted in the district, it is not with the
improving the sheep upon the hills, but of
; half-bred animals suitable to the richer lands
ver parts of the country, and for grazing only.
purpose the old ewes of the mountain farmers
times bought by the occupiers of low-lying
cross with the Leicester ram, and the produce
l capable of very profitable growth for the
attaining considerably greater weight than
Herdwick, which averages (moderately fat at
s of age) perhaps a trifle over 12 lb. to the
nd seldom, when fed to the utmost, exceeds
quarter. The sheep, however, of different
mountains vary in size to so great an extent
Herdwicks are occasionally classed in two
the large and the small. Not merely size,
r, and other properties, are likewise affected
il, or the climate, or something else connected
pasturage, of the different mountains and fells.
f the large breed of Herdwicks, transferred
l-breed district, would gradually, we are in-
believe, become composed of sheep of di-
size; while, *vice versa*, the progeny of the
ort would by degrees assume the size and cha-
their larger neighbours; and this even with-
nixture of blood. Subject to allowances for
uences of the kind we have mentioned, the
ieral description applies equally to both larger
ler Herdwicks. The bone is extremely fine,
mutton of choicest quality and mountain
The wool varies in quality, but is usually
nd averages about 3 lb. to the fleece: more
: on some farms, and more on certain moun-
n on others. Its selling price is commonly
lf that of Leicester wool. Most of the sheep
; a few greyish, or white with a mixture of
Their faces are black, speckled black and
ey, or black with grey noses. In the matter
by the-by, fashion and fancy exercise some
over the tastes of breeders, many preferring
th dark faces and "frosty" or grizzled muzzles.
are mottled or grey. The ewes, and most of the male sheep also, are hornless; some of the latter, however, have horns, or at least small sprouts of horny substance.

The per-centage of lambs raised upon a farm in proportion to the number of breeding ewes will be found to vary greatly according to the season. Taking an average of years, in a place of tolerably favourable situation, we have from each hundred of ewes about seventy-five lambs reared to the age of one year. The figures 25 will represent ewes which failed to breed, ewes which lost their lambs or brought dead lambs, and those whose offspring perished from the inclemency of the first winter. Few yield more than a single lamb at birth. In some of the wilder parts of the Lake district the difficulty of rearing the produce of flocks upon bleak and exposed farms is greater than in the instances from which our calculations are drawn. Indeed the variation in proportion of yearlings to ewes would probably have a range of from 20 to 30 per cent., if we were to take the very best and very worst situations.

On the approach of winter, the lambs are usually sent down from the hills to lowland arable farms, at the cost of abou[illegible] 5s. each for winterage—from October to Lady Day. The survivors only are paid for, and these may be reckoned at quite, or something, over 90 per cent. of the lambs or hoggs sent down.

From the stock of breeding ewes, yearly renovated by selections from among the young ones, drafts are made when necessary, the "crock" or discarded ewes being sold frequently to lowland farmers for the purpose of producing cross-bred offspring to the Leicester ram. The healthiest and most robust-looking dams are retained by the hill farmers, without reference to exact age; so that those of strongest constitution are likely to be represented by the most numerous progeny. There is no such thing as retiring by rotation in the economy of a Herdwick flock.

A custom prevails among the Lake Mountains of letting a number of sheep with the land—generally not more than three-fourths of the number the farm, assisted by the common-right pertaining to it, is supposed capable of supporting. Upon each change of tenant the flock is valued by chosen arbitrators, who adjudge compensation to the landlord for deterioration, or reward to the out-going tenant for improvement of the flock, the in-comer binding himself to maintain the number and condition of the sheep, and to deliver them over to his successor at the end of his term of occupation.

The Herdwick has been some years recognised as a distinct breed, and in addition to the encouragement offered for its improvement by the liberal prize-sheet of "The Fell Dales Association," special attention is paid to it in this year's programme of the Royal Agricultural Society of England. We were glad to observe, in our notice of that Society's list of premiums, due prominence given to the two north-country breeds of mountain sheep known respectively as the "Herdwicks" and the "Lonks."—*Bell's Messenger.*

FARM-YARD MANURES.

AT the Quarterly Meeting of the Logie and Lecropt Farmers' Club, held at the Bridge of Allan, on the 7th May, the following discussion on "Farm-yard Manures" took place :—

Mr JOHN PEAT said—Farm-yard manure is the most efficient source we have to look to for permanent success in raising crops. Artificial manures, in favourable seasons, increase the growth wonderfully, and I do not see how we could get well on without using them extensively, both alone and along with farm-yard dung ; but their efforts in our favour are only for a season, and having a tendency to exert the land for the time being beyond its natural strength, after the effects of it are over, the land is left in a poorer state than previous to using it. Nitrate of soda and sulphate of ammonia prove especially injurious to the following crop. Lime has long been, and to some extent continues to be, favourably estimated as a manure. I think it has many virtues, but I have never found it to have enriching qualities of much value. Some of the advantages of liming are—it brings into action for the nourishment of plants vegetable matter already existing in the soil in a dormant state ; it loosens the clay soils, and enables us with an indifferent seed time to get a mould for the seed which otherwise could not be got; and it saves a good deal of the cost of labour in preparing that sort of land in all kinds of seasons. Repeated limings, however, like repeated applications of artificial manure, have a tendency to exhaust the soil, and necessitate heavier manuring with farm-yard dung, in order to keep it in that most desirable condition—good heart. Farm-yard dung is made up principally of animal manure and straw ; the stable, feeding byre, and cattle court contribute the bulk of the heaps—the two former being the most valuable, while that made by wintering and young cattle is of less value. It is evident its value very much depends on the kind of food the stock receives ; we should therefore pay a good deal of attention to the quality of the food, and instead of having the manures worth 5s. or 6s. a ton, endeavour to increase its worth to 10s. or 12s. a ton. Our green crops are vastly increased when the land is manured with that made by feeding cattle. It is generally allowed, from 2 to 3 bolls of beans an acre more are grown with the same quantity of this kind of manure than from that made by wintering cattle, prepared and put on the land in the same state, besides the after crops being materially better. I think oilcake, along with turnips and a mixture of other feeding substances, answer the double purpose best, for producing beef and enriching the manure. By giving 3 lb. of cake daily to store cattle it helps the manure considerably. A great deal of waste and neglect goes on with the way the
manure heap is attended to. Our farm stea
in general not well adapted for having it
kept. The most of our cattle courts are b
much exposed to provide against this waste.
courts are necessary to keep out rain and
The warm manure from the stable sh
regularly mixed with the colder and l
menting kinds, which improves the who
makes it uniform in quality. The drains f
different byres should, if possible, run into th
and their contents thrown over the dung. T
riches the heap very much, and is the cheap
most effective method of applying the liquid
soil. Ashes and scrapings collected about th
ing ought not to be put among the other dung,
themselves, and put on extra to the other dung
parts of the fields. Notwithstanding that chem
us decay and loss almost immediately begin a
in the heap, I find it better to suffer this, and
in a rotten state to the crops, especially to tho
that are rapid in their growth and come early
rity. Turnips and potatoes grow a better cr
short than with long dung. A braird of the f
sometimes got by using well rotted dung, whe
with that unfermented and recently made.
kinds of crops thrive best when the land is
just before sowing. Beans are, perha
exception. I think that though the land is du
November or December previous, and allowed
that seemingly careless state—spread on the
and exposed to all sorts of weather till plou
spring at sowing time—the crop turns out as
the more recently manured portions. With
and other green crops it turns out quite differ
certainly saves labour at a very busy season, b
ing in autumn and winter ; but they never do
as putting it in the drill before sowing, and a
exposure in the heap and drill as short a
possible.

Mr JAMES M'LAREN—I, as well as most
brother farmers, are quite unqualified to follow
subject chemically. This, no doubt, is muc
regretted, as I am fully satisfied every one of u
to analyze the manure heap by some plain and
process, through which we should be able to
the most profitable time for its application to
for the different crops. The material that go
great extent to make up the manure heap is
value as manure until it has undergone a
amount of fermentation, and it is of still les
after it has been too sorely fermented, and wh
composition has done its part thoroughly, the
thing may be said to be lost. These are facts a
by most practical farmers ; so there can

n the mind that it is a matter of no
ortance to ascertain the proper time to
means for keeping the manure heap in
of fermentation desired, until such time
d may be prepared to receive it, or the
itable for carting it on. This may be
ed to a considerable extent by turning, and
application of liquid ; as to prevent over
n, tramping should be resorted to, and a
lication of liquid. A good deal has been
he application of liquid manure to fields and
I at one time had an opportunity, under
circumstances, of testing whether liquid
good quality would pay the expense of
nd carting ; but I, like most others, after
' trial, gave it up as an unprofitable specula-
ere liquid can be made available over
y natural gravitation, there can be no doubt
y, but where this cannot be done, I have
rofitable to retain the liquid and return it
the manure-heap frequently ; or allow the
ss slowly over a tank or large ditch, occa-
ted over thinly with any waste substances,
ed wreck or weeds, potato tops, or peat-
I have for years collected several hundred
d turnip manure from the last mentioned

ES FINLAYSON—The enlargement of the
p on the farm is most important, and what-
got of weeds gathered off the land, saw-
he like, should be collected and spread
for though these may be almost valueless
n themselves, all of them, and many things
, become valuable manures when mixed
d decomposed. It would be an immense
dryfield farms especially, if the straw-yards
l in, as where there is such dependence
laced on the breeding and rearing of stock,
w requires to be used for fodder ; but, as
nd, a little of the above-mentioned ingredi-
h like, spread under the cattle occasion-
elp to keep them dry, and augment the
ap. I believe that sawdust is very much
s a manure, but having used it so long as
my feeding-cattle and milch-cow sheds, I
absorbs a great deal of the surplus liquid in
nd becomes, when mixed in the dunghill
posed, an excellent fertilizer, for potato,
cereal crops ; and although I have not ex-
t, I believe it will be more so for clay land.

RLES WINGATE—Upon the proper applica-
nures our farmers' success and comfort
ime and animal and vegetable substances
pplied to land for many ages, without any
wledge higher than the experience of re-
lication producing similar results ; but
as to some extent dispelled our ignorance,
by disclosing the component parts of animal, vegetable, and mineral substances. We are told that vegetables have carbonic acid, water, and ammonia as their chief aliment, in combination with certain minerals and earths, for elaborating the organic elements ;—that there are found in plants, lime, potash, soda, magnesia, silica, sulphates, and phosphates, and as, these are gathered from the soil the quantity requisite for the growth and health of plants becomes exhausted, or so much reduced, that means are resorted to to supply the waste, and bring the various substances immediately essential within the reach of the grains and grasses destined to provide food for man and beast ;—that carbonic acid and ammonia, through the agency of the sun, are decomposed and assimilated by plants ;—that potash is essential for cultivated plants, and is supplied to a large extent from clover and turnip droppings ;—that soda, which is usually in union with potash, is found in the dung heap and in common salt;—that sulphur is found in all plants, and phosphor is essential to their healthy growth, hence the increased and increasing demand for various sulphates and phosphates now so familiar in commerce ;—that the sulphates of magnesia and lime are useful in the production of turnips and potatoes, and lime is held as the only reliable substance for the cure of finger-and-toe in turnips ;—that nitrates and salts of ammonia also increase the growth of cultivated plants when accompanied with the suitable earthy substances already alluded to. Lime decomposes all vegetable matters in the soil, and corrects any acidity in the organic matter so as to destroy the food of various troublesome weeds—that it assists in the decomposition of certain salts whose bases form the food of plants ; in fact, it is an excellent solvent when applied in proper quantity, and at the proper time. In regard to farm-yard manure, this seems from every account to be the most important of manures to the farmer, as it contains all the elements upon which plants live. The richer the food is of live stock the richer will the manure be, and the loss sustained by the withdrawal to market of grain, hay, and dairy produce can only be supplied timeously by artificial manures, which are happily so well understood. Farm-yard manure is required for the nourishment of potatoes and also of beans, and it is of the utmost importance in the production of clovers and grasses. The question, however, before us is, what is the best mode of preparing this manure? It may be difficult to decide it, as seasons and places may be so unlike each other as to baffle all attempts at solution. However, there is one mode which is recommended ; it is, that the liquids should be allowed to flow from the stables and byres into tanks or pits placed 3 or 4 feet below the level of the ground, the solids being placed on the top, so as to admit of their absorbing the gases as they escape from the liquid.

ELD EXPERIMENTS ON CLOVER SEEDS AND PERMANENT PASTURE.

BY DR AUGUSTUS VOELCKER.

'HE conditions under which ammonia, lime, or phosphates act beneficially upon vegetation, are etter understood than those under which nitrates lts of potash may be applied to the land with ntage. For this reason I instituted during the five or six years numerous field experiments, with pecial view of affording to the practical farmer the ns of judging for himself when he might with ntage employ potash manures or nitrate of soda.

1864 and 1865 my experiments were tried fly on light sandy soils, and having found potash acious when used in the shape of muriate or hate of potash, and still more so when applied to land in conjunction with superphosphate of lime, s anxious to ascertain whether the same beneficial ts which resulted from the use of potash salts and phates on light soils would also manifest thems on clay land. In 1866 I consequently experited upon heavy land with precisely the same ures which in previous years had given me a more ss favourable result on sandy soils ; but although ral sets of experiments were tried in various parts e country, no benefit whatever resulted from the ication of salts of potash on heavy land either to s or to clover seeds.

is useless to record in detail all the failures, or er negative results, which were obtained with sh manures on soils containing a considerable proion of clay. I may, however, mention in partir that, at my suggestion, Mr Robert Vallentine, urcott Lodge, Leighton Buzzard, applied salts of sh upon potatoes, mangolds, swedes, and clover, years in succession, without experiencing the test advantage from them, whether they were apd early or late in the season. Some of the experital fields at Burcott Lodge Farm were decidedly and retentive, in consequence of their containing h clay ; others were of a more friable character poorer in clay ; but in neither case did potash do good. It is evident, therefore, that either these contained naturally a sufficient amount of available potash to meet all the requirements of the dift crops experimented upon, or that by good agement enough potash was restored to the land e ordinary course of manuring and good farming ender the artificial supply of potash superfluous. s must not be supposed to be an exceptional case, as already mentioned, I have not as yet met with gle instance in which potash salts produced any l effect on arable clay land.

ield experiments, in order to be practically useful, ld always be tried for a succession of years under reat a variety of conditions as regards soil, time, mode of application, and crops, as possible. It rther desirable to employ the same fertilizing substances or their mixtures from year to year, and altogether to deviate as little as possible in succeeding years from the plan fixed upon in instituting a definite experimental inquiry ; for it is impossible otherwise to obtain comparative results and clear indications of the peculiarities of action of the various manuring elements.

In a former paper on field experiments on clover seeds, I gave a detailed account of the reasons which induced me to select the manuring matters which I employed in previous experiments, and which I likewise used, with slight variations, in all subsequent field trials upon clover seeds. I need not, therefore, refer to the same subject on the present occasion.

The failures which I experienced on heavy land with potash manures in 1866, induced me to experiment during the last two seasons chiefly on light land, and the object of the present paper is to record the results of experiments on clover seeds and permanent pasture, which, under my direction, were carried out with praiseworthy zeal by several of my agricultura friends, in whose skill and care in making field experiments I have every reason to place full confidence.

Field Experiments on Clover Seeds, made in 1867 Escrick Park Home Farm, by Messrs Colema and Hull.

The field upon which the following experimen were tried grew barley in the preceding year. Tl usual mixture of clover and Italian rye-grass was sov with the barley. The seeds came up well, and tl plant was tolerably good and uniform on the pie selected for the experiments. Apparently the select piece of land was uniform in depth and in its gene character. It was divided into eleven equal and a joining plots of 1-20th of an acre each. The elev plots were treated as follows, as regards manure :—

Plots.	Name of Manure.	Quantity of Manure per Plot.	Rate per Acre.		
			tons.	ct.	l
1	Nitrate of Soda…………	22½ lb.	0	4	
2	Sulphate of Ammonia …	22½ ,,	0	4	
3	Mineral Superphosphate	22½ ,,	0	4	
4	Common Salt…………	22½ ,,	0	4	
5	No Manure…………	…		…	
6	Muriate of Potash…………	22½ ,,	0	4	
7	Sulphate of Potash…………	22½ ,,	0	4	
8	Sulphate of Lime…………	1 cwt.	1	0	
9	Mineral Superphosphate and Nitrate of Soda…………	22½ lb. 22½ ,,	0 0	4 4	
10	Mineral Superphosphate and Muriate of Potash…………	22½ ,, 22½ ,,	0 0	4 4	
11	No Manure…………	…		…	

he artificial manures were sown by hand on the of April; the clover was cut on the 12th of June he first time, and a second cutting was obtained ast 24, 1867. The produce of each plot was careweighed on the same day, and as soon as cut, ı the results incorporated in the following table obtained :—

LE shewing the Produce of Artificial Grasses ixed Clover and Rye-grass) on Experimental ots of 1-20th of an Acre each, made at Escrick rk Home Farm, York, in 1867.

Manure used.	Weight of Clover.								
	1st Cutting.			2d Cutting.			Total.		
	cwt.	qr.	lb.	cwt.	qr.	lb.	cwt.	qr.	lb.
Nitrate of Soda	8	2	7	2	0	7	10	2	14
Sulph. of Am.	10	2	0	2	1	17	12	3	17
Min. Superph.	5	2	14	2	2	9	8	0	23
Common Salt	5	2	16	2	2	7	8	0	16
No Manure	5	1	26	2	3	4	8	1	0
Mur. of Potash	6	1	21	3	1	14	9	3	7
Sulph. of Potash	5	1	12	2	2	7	7	3	19
Sulph. of Lime	4	1	23	2	2	3	6	3	26
Min. Superph. and Nitrate of Soda	10	3	16	2	0	0	12	3	16
Min. Superph. and Muriate of Potash	9	0	0	4	3	2	13	3	2
No Manure .	6	0	17	2	3	2	8	3	19

Hull kindly furnished me with the following , which he took on the field during the progress experiments :—

e manures were sown on the 11th of April, and rceptible change was produced by any one of until the 23d of April, when the clover seeds on and plot 9 could readily be distinguished from on all the other plots by their darker green and more vigorous growth.

t 1 was dressed with nitrate of soda alone, and with a mixture of nitrate of soda and superhate. Both plots had a darker green colour than it throughout the experiment.

nitrate of soda on plot 1 encouraged the growth rye-grass to such an extent that it quite smothered owth of the clover plant.

2. *Sulphate of Ammonia.*—The rye-grass grew usly, but was not so long and coarse as the ryen the plot dressed with nitrate of soda, while it perior in quality in comparison with the latter. over on plot grew fairly, but was weak.

3. *Mineral Superphosphate.*—Rye-grass good, ver thin, very weak, and much blighted.

4. *Common Salt.*—Rye grass and clover fair, ort.

5. *No Manure.*—Appearance of plant much at on the preceding plot.

6. *Muriate of Potash.*—The clover on this as very good both as regards colour and vigour wth, and the rye-grass also was strong and of quality.

Plot 7. *Sulphate of Potash.*—Clover good, but rye-grass weak.

Plot 8. *Sulphate of Lime.*—Rye-grass very thin and unhealthy in appearance; the worst piece of the eleven experimental plots.

Plot 9. *Nitrate of Soda and Superphosphate.*—Clover plant quite smothered by rye-grass, which grew very long and coarse, and of quality little better than good oat-straw.

Plot 10. *Superphosphate and Muriate of Potash.*—Decidedly the best plot; clover remarkably strong, with a good broad leaf of a dark green colour. Rye-grass also very vigorous and of excellent quality.

Plot 11. *No Manure.*—About the same as plots 3, 4, and 5.

Second Cutting.

Plot 1. There was scarcely any clover in the second cutting, and rye-grass also was very thin and weak.

Plot 2. Clover very weak; rye-grass much better than on the preceding plot, though short.

Plot 3. Much the same as plot 2; rye-grass not quite so strong.

Plot 4. Rye-grass and clover short and weak.

Plot 5. Clover fair; rye-grass short.

Plot 6. Rye-grass good; clover leaves broad and of a good colour.

Plot 7. Clover good; but rye-grass weak and thin.

Plot 8. The produce on plot 8 small and weak.

Plot 9. Merely a few plants of clover were left on plot 9 after the first cutting, and the rye-grass was very thin and weak; the soil appearing to have been quite exhausted by the first cutting.

Plot 10. Clover very good, with a good broad and dark-coloured leaf; the rye-grass also strong and healthy. By far the best plot.

Plot 11. Much the same as 4 and 5.

We owe to Messrs Lawes and Gilbert a series of most valuable and instructive field experiments on the influence of different fertilizing matters on the quantity and quality of the produce of permanent pastures. The changes which several of the fertilizers employed by Messrs Lawes and Gilbert produced in the character of the herbage of several of their experimental plots are so instructive, that for some years past I have made it a point to pay a visit to Rothamsted Park at the time when the grass crop is in the height of perfection. Having frequently seen with my own eyes in what a remarkable degree the growth of true grasses, especially the coarser kinds, is encouraged by nitrogenous fertilizers, and having also noticed the changes which a mixture of salts of potash and superphosphate produces on permanent pasture in the relative proportions of leguminous plants and true grasses, I was quite prepared for similar changes in the produce of the Escrick experiments. But the differences in the quality of the produce of some of the experimental plots at Escrick Park were more striking than any which I had previously witnessed at Rothamsted Park or anywhere else.

The Italian rye-grass on plot 9 I found at harvest time, as Mr Hull truly observes, so exceedingly coarse, that it appeared scarcely better than good oat straw, and very few clover plants could be seen. Again, the effect which nitrate of potash, and in a still higher degree a mixture of muriate of potash and superphosphate, produced on the clover plant, was truly magical.

I never before witnessed anything so striking and instructive as these experiments on artificial grasses. There must, of course, be a good reason why in this instance the quality as well as the quantity of the grass crop were so much more powerfully affected by the different manures than I found to be the case in other experimental trials. We know that the character of the soil materially affects the quality and the weight of the crops we raise upon different classes of soil. It is, therefore, natural to connect the remarkable results obtained in the Escrick Park experiments with the peculiar character of the soil on the experimental field. I have, therefore, taken care to obtain a fair average sample from the field on which the grass experiments were tried, and after drying the sample at 212 deg. Fahr., I submitted it to a careful analysis, according to which the composition of the soil may be represented as follows :—

Composition of the Soil of the Field at Escrick Park Home Farm, on which the Experiments upon Clover Seeds were tried.

Organic matter and loss on heating ...	4.28
Oxide of iron	.61
Alumina	2.16
Carbonate of lime	.39
Sulphate of lime	.25
Carbonate of magnesia	.23
Potash	.14
Soda	.05
Phosphoric acid	.08
Insoluble siliceous matter (sand)	91.81
	100.00

Even a superficial inspection will shew at once that this is an extremely poor and very light sandy soil. Mr Coleman moreover informs me that the field from which this soil was taken had been badly farmed, and that it was in consequence in a poor agricultural condition.

It will be noticed that this soil is remarkably poor in available potash, and I may add, in almost all the more valuable fertilizing constituents found in good soils. The total amount of oxide of iron and alumina was not quite 3 per cent., and of lime there was not a half per cent. On the other hand, it abounds in silica, for on examination I found the 92 per cent. of siliceous matter which enter into the composition of this soil to consist almost entirely of pure fine-grained quartz sand.

I need hardly say that a soil containing 92 per cent. of sand and very little clay, and a still smaller proportion of the more valuable soil-constituents, has o be regarded as extremely poor. Such soils are
readily exhausted by cropping, and though th
yield fair crops when liberally supplied with n
they are naturally very unproductive.

The extreme poverty of this soil in available
at once intelligibly explains the benefits whic
the clover seeds and the Italian rye-grass derive
the application of muriate of potash ; and pres
with a good illustration of the utility of ch
analysis and the aid of the chemist, of wh
practical farmer may occasionally avail himse
advantage. The analysis clearly points out
ciency of potash and also of phosphoric aci
hence the employment of potash manures on l
that description may be recommended with conf
The composition of land like that of the soil
experimental field moreover shews that lime o
marl may be applied to it with advantage, and
is impossible to grow any good roots, or ba
wheat, or clover, on land of that character
giving it a liberal dressing of phosphoric m
Moreover, the loose and porous nature of the s
the want of a fair proportion of clay in it,
indicate the necessity of manuring it b
moderately with ammoniacal or nitrogenous m
for as the proportion of available mineral cons
which enters into the composition of the ashe
usual farm crops is but small, and the solu
these matters in water is greatly facilitated
moniacal salts, such poor soils are all the more
exhausted when the crops grown upon them
liberally manured with fertilisers rich in nitr
matters, or in salts of ammonia.

For the sake of better comparison, I have ca
the yield of each experimental plot for an a
placed the results in the subjoined table :—

TABLE showing the Green Produce per Ac
Plots of Artificial Grass (Clover Seeds a
grass) grown at Escrick Park Home Farm,

Plots.	Manures used.	Produce per Acre.						
		1st Cutting			2d Cutting.			T
		tns.	ct.	lb.	tns	ct.	lb.	tns.
1	Nitrate of Soda	8	10	28	2	1	28	10
2	Sulph. of Am.	10	10	0	2	8	4	12
3	Min. Superph.	5	12	56	2	11	68	8
4	Common Salt	5	12	96	2	11	28	8
5	No Manure .	5	9	72	2	15	80	8
6	Mur. of Potash	6	8	84	3	7	56	9
7	Sulph. of Potash	5	7	16	2	11	28	7
8	Sulph. of Lime	4	9	12	2	10	60	6
9	Min. Superph and Nitrate of Soda .	10	17	96	2	0	0	12
10	Min. Superph and Mur. of Potash	9	0	0	4	15	40	13
11	No Manure .	6	3	4	2	15	40	8

An attentive perusal of the preceding fig
bring to light several particulars, on which a
servations may not be out of place :—

1. In the first place it will be noticed that t

were left unmanured. In all experimental trials, at least two, or if possible three plots, should be left unmanured. Although the crop in a field may appear quite even and the soil uniform as regards depth, texture, and general character, the weight of the produce of such a field invariably differs to some extent in different parts. Natural variations in the productive powers of different portions of the same experimental field must be expected to occur in all cases; but these variations must not surpass a certain limit, or else no fair and legitimate deductions with respect to the efficacy of the manuring matters employed can be made from the results of the experiments. Many of the anomalies which so much perplex the experimenting farmer, I am inclined to think, are often solely due to inequalities in the soil, or to differences in the agricultural condition of the several experimental plots. For this reason it is absolutely necessary in field trials to determine whether the natural variations in the productive powers of different parts of the experimental field are not so great as to spoil the experiments altogether. In the case before us it will be seen that one of the unmanured plots yielded, when calculated per acre, 8 tons 5 cwt. and 40 lb., and the second plot 8 tons 18 cwt. and 44 lb.; the variations in the produce of the two plots thus amounted to 13 cwt. and 4 lb., shewing no greater difference than can be expected under favourable circumstances.

2. Neither common salt nor sulphate of potash appears to have had any effect upon the produce, for it will be seen that the weight of the clover seeds on plots 4 and 7, dressed respectively with salt and sulphate of potash, was somewhat less than that of the unmanured plots. I attach no value to the apparent diminution of the produce on plots 4 and 7, for the decrease is not sufficiently large to entitle us to infer from the result that the saline matters used on these two plots had an injurious effect upon the crop.

3. On plot 8 sulphate of lime was used at the rate of 1 ton per acre. This is a very large dose. Although sulphate of lime or gypsum is but sparingly soluble in water, and for that reason may be used with perfect safety in much larger quantities than in this experiment, provided it is well mixed with the soil, a large dose of finely-powdered gypsum, when applied as a top-dressing to young clover-seeds, appears to injure the plants and to retard the growth.

4. It is worthy of notice that whilst common salt had no effect upon the produce, muriate of potash materially increased it. We have here another direct proof that soda is incapable of taking the place of potash in the nutrition of plants.

5. On plot 3 mineral superphosphate alone had no effect whatever on the crop. This is an interesting result, for it seems to indicate that the great deficiency of potash, which is characteristic of the soil of the experimental field, entirely prevented the display of the useful functions which we know perfectly well that superphosphate of lime does discharge on land of a better character. On poor light sandy soils we may learn from this that a purely mineral superphosphate cannot be used with advantage for clover-seeds. I may observe in passing that on such soils mineral superphosphate has even little effect upon root-crops, for which phosphatic manures are so largely used with the best effect.

6. It is remarkable that whilst plot 3, manured with mineral superphosphate, gave no increase whatever, and plot 6, manured with muriate of potash, gave an increase of 1 ton 4 cwt. and 42 lb. over the average produce of the two unmanured plots (average produce, 8 tons 11 cwt. and 98 lb.), the mixture of both manures on plot 10 gave the largest weight of clover seed and rye-grass per acre of any of the eleven experimental plots.

In the first cutting, plot 10 produced 9 tons, and in the second nearly 5 tons of green clover seeds, or both cuttings yielded in exact weight 13 tons 15 cwt. and 40 lb., which is an increase of 5 tons 3 cwt. and 64 lb. per acre over the average yield of the two unmanured plots.

Plot 10 gave not only the largest increase per acre, but the quality of both the clover and rye-grass was much superior to that of the produce of any other of the various experimental plots.

7. There is another circumstance connected with the result obtained on plot 10, which deserves the best attention of the practical agriculturist. It will be seen that, although the first cutting produced a heavy crop of clover seeds of by far the best quality of any of the experimental plots, the land was left in a better agricultural condition after the first cutting than where no manure at all was applied, and a much smaller weight of green clover seeds was reaped at first; for on plot 10, the second cutting yielded nearly 5 tons of green produce, in addition to the first, whereas the two unmanured plots, No. 5 and No. 11, yielded only 2 tons 15 cwt. of additional produce in the second cutting. The liberal supply of available potash and soluble phosphates thus had the effect of greatly increasing the weight of the crop, improving its quality, and leaving the soil in a better agricultural condition for the next crop.

8. Again, it will be noticed that on plot 6, on which muriate of potash alone was employed, the second cutting weighed more than the second cuttings of the other plots, except that of plot 10, where superphosphate was added to the potash salt. It therefore appears that the beneficial effects of potash on soils so poor in this element as the land on which these experiments were tried, has a more permanently beneficial effect than some of the fertilizing matters which were used on other plots.

9. On the other hand, nitrate of soda unmistakably had a tendency to exhaust the land; for it will be noticed that on both the plots 1 and 9, on which nitrate of soda was used, the second cuttings weighed less than those of the unmanured plots.

As already mentioned, the nitrate of soda on plots 1 and 9 encouraged the growth of very coarse and inferior rye-grass, which completely smothered the clover plant.

When I saw the experimental field late in the autumn of 1867, after harvest, the contrast in the appearance of the various experimental plots was most striking. Whilst the land on plots 1 and 10 appeared quite burned up and exhausted, and scarcely any clover was visible, the potash plots could be readily distinguished by a dark green colour and healthy look of the remaining herbage in which clover predominated.

We may thus learn from these experiments that nitrate of soda alone, or even in conjunction with superphosphate, should not be used as a top-dressing for artificial grasses on very poor sandy soils, like the soil of the experimental field, inasmuch as nitrates hasten the exhaustion of the potash naturall in such soils in very small proportions. nitrate of soda and, in a minor degree, a salts, are the worst artificial manures that ca under such circumstances. It may further be that no just estimate can be formed of the rea a special manure, if no account be taken of t tion in which the land is left after the crop removed from it. This is not the first ti have noticed this tendency of nitrate of soda t rapid exhaustion of naturally poor soils, and therefore strongly recommend farmers to abs the employment of it as a top-dressing for corn crops which are intended to be grown on poor sandy soils.

THE ALLOTMENT SYSTEM.

FROM what I myself know of the working of the allotment system, and from inquiries I have made of others who have had experience in the management of such undertakings, the suitability of the situation of the land is one of the first considerations. No one in the present day would think seriously of establishing the system of allotments in a purely agricultural district. There was a time, but happily this was many years ago, when there appeared to be a large surplus of agricultural labour in many parts of the country. At the time I speak of there were many labourers in country districts who were only partially employed, and these, as well as those who were in more regular work, were notoriously but poorly remunerated. Distress was common among this class, and all sorts of plans were devised for its relief. Among other schemes, allotments of land for the unemployed were strongly advocated, and it was proposed that these should be of a size sufficient to produce the necessaries which a labourer's family required. This plan was looked upon most favourably by many, and their opinion of its merits was greatly strengthened by the publication of numerous instances of the wonderful productiveness of well-managed soil. A page might be filled with these statements. Mr Cobbett, for example, stated that a cow could be kept on a quarter of an acre of land, and professed to shew how this could be accomplished. The *Labourers' Friend Magazine* more modestly affirmed that a cow and a pig could be well fed from an acre, besides supplying the family with what produce they might need. Those, however, who knew what sort of treatment would be required to bring out results such as these, and what are the capabilities of the average of soil under average management, thought that it was more probable, in the generality of cases, that the cultivation carried out by those into whose hands the allotments would be placed would not come up even to a of carefulness and attention, and they progn nothing but failure as the result of any suc ment. This opinion proved to be correct w was made of the plan upon a somewhat scale. The holders of the allotments were the better off, even during the time when working out the strength of the soil. When been done, the greater part gave up their leaving it to whoever might come after them t the goodness which they had extracted from Another point, which those who advocat farms for the million did not seem to have t consideration, was, Where was the capital from to enable the holders to crop their groun buy the cow and the pig which were to be fe and which were to produce the manure wh be wanted for the next crop, and what were means of subsistence during the time the c coming to maturity? But no more need be this point. It is now pretty well agreed on that no system of allotment can profitably place of regular employment in the occu which a labourer has been brought up. means his ordinary resources may be suppl but they should never be depended upon as source of his subsistence.

Of late years times have changed materiall better with the agricultural labourer in the ne hood in which I reside. It was also stated day in a Hampshire paper, that wages had at least 20 per cent., and the accounts we r other parts of the country give a very favou port of the labourer's condition. Cheap mar cheap clothing have no doubt added material prosperity. The fear which was expressed extension and improvement of farm machine tend to diminish the demand for labour has by no means been realised. True it is that machinery simplifies and makes economical almost all descriptions of work upon a farm, but by its employment work is done more effectually. Improved farming produces heavier crops; more stock is kept; more manure applied; and drainage where hitherto neglected is almost universal. The extra work which high farming calls for in these and other ways more than makes up for that which machinery saves. There is no such thing as a steady farm labourer out of employment hereabouts. There are in the neighbouring town, as I suppose there always will be, a certain class of labourers who are not in constant work. These are men who do not care to labour unless it is low water with them, and who, having got a job, shew neither steadiness nor workmanship of a character which makes the employer anxious to continue their services. But I do not recollect a time when the agricultural labourer who was to be trusted was better off. As regards the allotment system being of benefit to such as these, on the contrary, I have often heard it urged that it was likely to be a cause of dissension between master and man. A busy time in the allotment ground would be a busy time also on the farm. The employer would not be likely to approve of the one being left for the other, and it is highly desirable that everything should be avoided which might cause a coldness on either side. Nor is such assistance, under present circumstances, at all needed. The wages paid are, with due economy, sufficient to keep the family in comfort and send the children to school, the cost of which is inconsiderable. Here they will be better employed than they would be in working an allotment, for it should be borne in mind that the more scientific farming becomes in its character and machinery, the more intelligence will be called for on the part of those who are engaged in it. Education in future is likely to be needed by the farm labourer as well as other operatives.

The great desideratum in this and many other neighbourhoods is an improved class of dwellings for agricultural labourers. The blame that is incurred on account of the want of this rests, of course, entirely with the landlord; and the wonder is that such short-sighted policy should continue in force. Some are ignorant enough of the feelings of the class to say that a working man who has been brought up under no better conditions does not value the comforts and conveniences of a more civilized home. There can be no greater mistake than this. I lately had an opportunity of witnessing the effect of this matter being attended to in the way in which it should be done. A friend of mine, who is a large landed proprietor, some years ago built some neat and conveniently arranged cottages, in number sufficient for the accommodation of the workmen who are regularly employed on the estate, extending this even so far as to include the shepherds living on the distant hills. To each of these dwellings a small flower-plot was attached in front, and a moderate-sized garden behind. Both his goc wife and himself take an unobtrusive interest in tl occupants of these dwellings for the time being, ar every year give prizes for the best kept cottages ar gardens. The effect of this is that which might l expected. So much is the possession of one of the cottages valued, that the best labour of the district always at the proprietor's command; and more th this, they are an inducement to the best behaviour, those who hold them for the time know that if frc any fault of theirs they are dismissed, there are othe who would be willing enough to take their place. T rent which is charged does not certainly bring a hi per-centage on the outlay; but who can estimate t addition that is made to the actual money payment the shape of willing instead of enforced, good inste of bad, service? The owner has also the satisfacti of knowing that in this particular he has done much aid the decency and respectability of those who a dependent upon him. It would be well for all parti if more proprietors were to follow his good example

It is in the immediate vicinity of towns or even lar villages that the allotment system is likely to be carri out with the greatest benefit to the working classe Here it is that we find a large mixed population, a workmen of every description, some of these passi their hours of labour in a close and confined atm sphere, others whose occupation is sedentary, othe again whose employment is irregular, and who fi quently, through no fault of their own, are for a tir going about idle. To all of these a well-manag allotment is a source of health and profit, and the e perience of those who have had the management such an institution bears testimony that it is high appreciated by the allottees. One of the earlie reports of the Southampton Allotment Committ says:—"The sanitary advantages of allotments the poor of large towns must be very considerab They have, as a rule, no available gardens, and ca not afford to buy in the market or of greengrocers th due supply of fresh vegetables which they requir These allotments furnished with fresh vegetables a good potatoes 308 families, that is, above 1600 perso To those engaged in sedentary occupations, in cl courts, alleys, and lanes, with no inducement for ta ing exercise, the cultivation of allotments at some lit distance from their homes is most desirable, as it gi them the most efficient kind of exercise in the op air with a good object. One tenant, whose busin was sedentary, was wise enough to take an allotme for the sake of the exercise of cultivating it, and t following literal dialogue with a too corpulent allot gives concisely and clearly the gist of the matter:—

"Does it do your health good?"—"Does it, si I believe ye it does. I should go out of my mind it warn't for this bit o' ground. I lives in one of t closest parts of the town, and instead o' lopping i the beer-shop for half a pint, and lounging about says, 'I shall go up to my farm for a bit,' and it d me all the good in the world."

"Well, I am glad you have had such a good crop."—"Aye, sir, it's my pride is it; and I only grieve that others don't work their bits as they ought, so many as still be as wants the ground."

"And you get your vegetables very fresh?"—"Aye, that's what we do, I sold a peck o' peas to a body. She says, 'We can't get such peas as these at market.'"

There is still another sanitary advantage in the allotments, affording an immediate and useful outlet for manure from pigsties and stables, and for the refuse from the houses of the poor. It is remarked that allottees "farm high," and consequently make the most of that which is so much wanted in the country; indeed, the allotment is the poor man's bank in which he invests much of his savings. The value of allotments is also great, inasmuch as they satisfy one of the strongest and most wholesome desires of the labouring poor—the wish to possess land and to cultivate it for themselves.

The great bar to the extension of the allotment system in those places for which its beneficial influence is most likely to be realised, is the difficulty of procuring land of a suitable description in the immediate vicinity of a large population. I say of a "suitable description," for it is not every sort of soil which is adapted to the purpose. The land should be of at least medium quality as to goodness, indeed the more valuable it is for agricultural objects the better fitted it is for those of allotment: of course the better the land the higher will be the rent per acre; but an extra penny or twopence per rood paid for it by the allottees is as nothing when compared with the advantages which good land has to offer. On a kindly, well-drained soil, work can be undertaken in almost all states of the weather, crops are early in coming to maturity, and successional ones grow on later in the year, and they are easily kept clean when compared with those grown in land of an inferior description. Although the price may be higher per rood in the case of a good soil, a much smaller number of roods will produce the same amount of vegetables than would be required with that which is poor in quality; indeed, if nothing but inferior land is to be obtained, I should say that it would be almost better to give up all idea of letting it out in allotments. Any soil is improvable, but men such as would be the allottees, are not likely to be those who understand how to do this, or if they did so, would they have capital or patience to carry it out?

Intelligent farmers have long since discovered that, supposing you get what is called value for your money, high-priced land is in the end much cheaper than that which is low priced. If this be true under a system of management from which only one crop is expected, how much more must it be so when two, if not three, are looked for annually, which makes it necessary to be frequently working on the ground?

I have before me the rules and reports of several societies instituted for the purpose of carrying out the
allotment system. There is a great simil
rules, and it matters but little which I ofi
correspondent for his information upon thi
have also received letters from the acting
the committees of some of them. All bea
testimony:—"The allotments are of grea
the holders, are highly valued by them, an
always more applicants for ground than car
modated." The size of the ground give
allottee varies under different management.
cases it is the tenth part of an acre, up to
an acre, which is the highest. This latter si
say is almost too large, unless in exceptiona
It is a mistake to let any one have more g
he can work and manure well. That wh
known to all good cultivators should be in
the holders, that more profit is got out o
managed rood than out of two which are on
cultivated, and they should be urged on to
holdings to the best of their ability, with a
greatest amount of return from them.
charged ranges from at the rate of £6, 8s.
13s. 4d. per acre. This latter sum is far
which would be the price of good land in
such as has been indicated, as that which i
able for allotments. There is little doub
favourable situation, good land would be ta
the working classes at £2 per rood, or £
and it would pay them well even at that.
who sublet the land would have to take into
tion the expense of marking off the allot
the waste of ground in the necessary paths
sions, so that, unless willing to incur loss, t
rent must be by so much below the £8 cha
tenants. The rules of the glebe allotment
ampton were as follows:—

1. Term of tenancy from 29th Septemb
September. The re-letting shall be at th
the committee, who will consider the good
the tenant and his manner of cultivating the

2. One-half of the rent to be paid April
August 1.

3. No work to be done, or gathering
allowed, on any allotment on Sunday.

4. No ploughing permitted, nor any oth
cultivation allowed except by spade husban

5. No allotment to be used for any oth
than garden ground.

6. No occupier shall underlet his allotme

7. No live stock shall be turned out on
ment.

8. Any infringement of the above rules
the committee power to take possession of the
and all crops and other things that may be fc

N. B.—All doubts or disputes shall be set
committee, whose decision shall be binding.

There has been some difference of opin
those who have had the management of a
whether the holders should be selected on

good character, or whether the rule as regards the application should be "first come first served." The latter seems to me to be the right mode of deciding this matter. No question of previous character, unless there is something very flagrant, should operate as an objection, for to allow of such a barrier would be tantamount to denying our faith in allotments as an improving influence. In the report to which I have alluded, the experience of the Southampton committee is stated to be, that the payments for ground were best kept up by those from whom such regularity was least to be expected. But few, if any, applicants should be rejected on account of character for the first year. At the expiration of it any who have failed to do justice to the ground should be dealt with under the powers of Rule 1, as a neglected holding will prove a loss instead of a benefit to the allottee who has to pay for it.—*K.*, *in Land and Water.*

THE POTATO TRADE IN FRANCE.

We believe that the French people were the last nation in Europe who adopted the potato as a common article of food. It had been introduced to their notice so early as the year 1588, by L'Eclure of Arras, and four years after by Gasparin Bauhin, by whose efforts it was adopted in Switzerland, Suabia, in the neighbourhood of Lyons, the Vosgian mountains, &c. But such was the prejudice excited against it, that it made no progress in France. A report was raised that it caused the leprosy, and that as belonging to the Solanum family of plants it contained the most active of all poisons, the question therefore of its cultivation was set at rest, and remained in abeyance for upwards of a century. In 1713 an attempt was made by some of the landed proprietors to cultivate it on a large scale; but whether the prejudice still operated, or some unknown cause intervened, is not ascertained: the attempt proved unsuccessful, although the peasants of the Appenines had long substituted it for rye or wheaten bread, and other countries of Europe employed it in fattening cattle. It remained thus unknown generally in France until about the year 1780, when a cultivator of the name of Parmentier, being convinced, from observation in other countries, of the absurdity of the prejudice against the plant, resolved at all hazards to make an effort to promote its cultivation in his native country. He obtained land on the plains of the Sablon and Grenoble, and planted them with the potato on a very extended scale. A clamour was raised against him, and he was compelled to obtain a guard of soldiers to protect the fields by day; but the guard being withdrawn at night, the tubers were stolen by the peasants, who very soon began to change their opinions respecting it. His efforts, therefore, were crowned with success; for, notwithstanding the pilfering drawback, the 60 acres he planted without any manure, the root being new to the soil, yielded a large return of tubers, which from that time rose in the public estimation and consumption. In 1785, when a partial famine prevailed in France, in consequence of a failure of the crops of wheat and rye, the potato was found an excellent substitute, so far as it was cultivated; and "in the years 1795, 1806, and 1817," says a writer in the Dictionnaire, "it saved France from the horrors of famine, and has now taken its position among the most healthful, palatable, and certain aliments for both rich and poor," and such it has remained ever since; and, as we shall presently shew, not only are the French people themselves plentifully supplied with it, but large quantities are now exported to England and other European states, and some are even sent to the United States of America. Although the tuber was first introduced as an article of food to the French people by D'Eon de Celly, Bishop of Apt, in the South of France, Parmentier, who persevered so long and so successfully in its cultivation in the face of an opposition powerful enough to daunt any man of common calibre of mind, must ever be considered as a public benefactor to the French nation.

It is one of the valuable characteristics of the potato, that it will grow and flourish where cereal plants cannot be cultivated successfully. In Iceland, for instance, where the climate is so severe and the summers so short that even barley cannot be grown to maturity, the potato yields abundant crops. In Norway the tubers are reduced to a pulp, and then mixed with flour for making bread. In India, notwithstanding the heat of the climate, it is fast taking the place of rice in the support—and, I may add, the estimation—of the people, who find it more supporting than rice, which has hitherto been the almost exclusive food of the lower classes. The progress this root has made in the agricultural economy of France is very great. In the year 1815 its cultivation extended to 560,000 hectares, or 1,382,500 acres, which produced 21,597,945 hectolitres, or 1,856,883 tons. In 1840 it had reached 100,000,000 hectolitres, or 8,597,500 tons. Soon after this the potato disease intervened to check the cultivation, and it fell off materially for some years. In 1857 the French cultivators, finding that the disease had become modified in its extent and effects, resumed its cultivation; and in 1867 the product had reached 150,000,000 hectolitres, or 12,896,250 tons, while the breadth of land occupied by it was 1,400,000 hectares, or 3,851,680 acres.

Of this large quantity there have been exported 115,727,313 kilogrammes, or 113,660 tons, distributed as follows :—

	Kilos.	Tons.
England	66,735,984	65,453
Belgium	27,725,467	27,230
Switzerland	2,446,951	2,403
Algeria	6,433,055	6,318
Other countries	12,386,756	12,165
Fractions		1
	115,727,313	113,660

Marseilles has taken the lead in the export trade. In 1857 the quantity exported from that port was only 1,759,996 kilogrammes, or 1729 tons; in 1868 the exports from thence amounted to 10,850,644 kilos., or 10,657 tons. They were distributed as follows :—

	Kilos.	Tons.
Algeria	6,311,035	6198
Turkey	1,376,326	1351
Egypt	1,252,195	1229
Spain	517,118	507
Greece	344,202	
Italy	280,930	
Malta and Gibraltar	163,716	
Rio de la Plata	252,579	
United States	66,815	
Russia—Black Sea	59,870	
West Coast of Africa	53,900	
Roman States	40,305	
Other countries	131,656	
	10,850,644	
Fractions		

The account from which the foregoing are taken wind up their remarks by observin is evident that during these last seasons o harvests, not only has the potato rendered service to the populations of the interior of th but it has become an important object of c which must be advantageous to the nation ture." We add, that the value of the potatoes in 1867 was 5,789,448 francs, £231,258 sterling.

COOKED FOOD FOR PIGS.

I HAVE for a second time been trying an experiment in the line of fattening pork, and testing the merits of different varieties of food—cooked and uncooked—in the production of pork ; and although the pigs in question are not yet slaughtered, the experiment is virtually ended—the result of which, with a few suggestions, I propose to present to your readers. The animals selected for the purpose of experiment are pure-bred Chester Whites, their existence dating from March 31, 1868. They had been kept in good thrifty condition until October 24, when I commenced feeding them all they would eat of newly husked corn. They were fed one week and weighed; I then fed another week and weighed, noting the gains. I measured the corn, and the four pigs consumed exactly 1 bushel of shelled corn per day; the average gain per day during the week was a trifle under 9 lb. The account would stand thus: for every bushel of whole grain fed I received 9 lb. of pork—value, 1 dol. 08 cents; gain of each hog per day, 2⅛ lb. November [illegible]. I commenced feeding cooked Indian meal—fed eleven days and again weighed; the average daily gain during the eleven days was 11 lb. They consumed ¾ of a bushel of meal per day. The account for cooked meal would stand thus: for every bushel of cooked meal fed I received 13¾ lb. of pork—value, 1 dol. 65 cents ; gain of each pig per day, 2¾ vember 17, I commenced feeding cooked po meal (4 bushels of potatoes to 1 of meal), stirred in after the potatoes had been cook was fed eight days, when the pigs were agair the average daily gain being 9¾ lb. T sumed 1¼ bushels of the mixture dai account for potatoes and meal would for every bushel fed I received 7½ lb. —value, 90 cents. ; average daily gain per p November 24, I commenced feeding, in a cooked potatoes and meal, what Indian cor would eat. I kept no data as to the am sumed, but weighed again December 5, and weight of the four pigs to be 1361 lb.—a g lb. per head during a very cold week. I sh the amount consumed during the last elev experiment was largely above that consum previous period of equal duration. The re experiment helps to establish the convicti mind that to produce *cheap* pork, and t this cheap pork *fast* at least three things are and a *fourth desirable*. First, get a good hogs ; the Chester White is my favourite. feed cooked potatoes and meal principally. an occasional change of diet is indispensa most rapid development of fat, and conduc general thrift of the animal. If hogs are confined in a pen, dirt should be thrown in frequently, which will be greedily devoured. It prevents scurvy and costiveness. The fourth (*desirable*) part is spaying. I think this practice is very much neglected, and its value very much under-estimated by a majority of feeders. Although this article is not designed to discuss the merits or demerits of the practice, I would simply state that in addition to the above experiment, I noted the weekly gain of each hog, there being three sows and one barrow. The gain of the barrow was regular—that of the sows spasmodic. I noted the gain of a sow during one week when in heat—it was less than 6 lb. She then had connexion with the boar, and after recovering from the effects, I weighed after another week's feeding, and found the gain 24 lb. I have frequently noted gains of 4 lb. daily, and even more, in sows during the first few weeks of pregnancy. When we consider the fact that one-third of a fattening sow's time is occupied in the development of the procreative propensity, how can we fail to see the pecuniary interest involved in the adoption of the system of spaying? Do away with the old system of feeding uncooked food. Get a large kettle, and employ some good mason to fix it nicely in an arch, if you cannot do it yourself. Get your arch wood dry in advance. Fill your kettle two-thirds full of potatoes, and water enough to cook them ; after they are cooked add as much meal as you can stir in. When sufficiently cool, feed your pigs. Pursue this course, and if you fail to grow some pigs which you will be proud to shew your neighbours—if you fail to save 10 bushels of shelled corn (worth 1 dol. 20 cents per bushel) for every 200 lb. of pork you make, then say that Wayne County never sent to the Albany market a hog that dressed 300 lb. An objection has been raised, that I failed to take into account the wood consumed in cooking the feed. In reply, I would say, I will bind myself to furnish wood, and cook all the feed required, for *two cents.* a bushel.—*W. F. Baggerly, Wayne County, New York, in Albany Cultivator.*

WIRE-WORM, AND A GLANCE AT HAMPSHIRE FARMING.

HAVING just visited Hampshire, I was pained to see so many oat and barley fields almost or entirely destroyed by wireworm. All this might have been easily, cheaply, and certainly prevented by the sowing of about 6 bushels of salt per acre just as the plants were coming through. I have some land subject to this pest ; but for several years, having used the salt, I have prevented their ravages. Oh, but, say or write many farmers to me, I have placed wireworms in salt, and they continued as lively as grigs, and therefore, it is clear that salt will not kill them. My reply has been—"Did you put any water with the salt?" This soon changed their opinion. It won't do to wait for evidence of damage before you apply the salt, for the withering of the plant only takes place after the stem has been bitten through by the wireworm. In some cases wireworms are the best friends to farmers—that is, when they only destroy one-half or two-thirds of the too thickly sown plants, thereby teaching a wholesome lesson on thin-seeding. A Hampshire farmer told me the other day, as I looked over his wireworm-eaten oat fields, that last year he had despaired of getting any crop, but the few plants left by the wireworm, having plenty of room for ample development, produced the most abundant crop he ever grew. I never drill more than 2 bushels of oats per acre, and have grown a fine crop from only 1 bushel. Hampshire is rather noted for thick sowing, probably with a view to smother the weeds ; for I was a good deal shocked, agriculturally, to find that it was not the custom, in the district I visited, to hoe out the weeds from the wheat. This, in Essex, would be considered a culpable and unprofitable neglect. The clovers would also pay for hoeing. I always hoe my clovers in the spring, and find it a paying operation. On one part of a wheat field, where a dung-heap had been removed, the wheat was densely thick and greatly advanced in growth beyond the rest of the crop. Here was an instructive lesson. It teaches us that with very high farming or rich manuring one-fourth of our ordinary quantity of seed would be enough, and that the excess in this case would be ruinous to the crop ; perhaps even two or three flaggings or decapitations could hardly save it from premature falling and rotting. I have always maintained, despite of many opinions to the contrary, that land can never be too rich for wheat, provided the proper or diminished proportion of seed be sown. When I am told that "we dare not feed off our turnips with cake and corn, for we should have prematurely laid crops of barley or oats," I at once see that the proportion of seed sown is not duly reduced to the improved condition of the soil. We should do with corn as we do with roots or with trees, apportion the distance between them, according to the space the plant or tree is expected to occupy within a given time, which of course will depend on the richness or poverty of the soil. I almost envied our Hampshire friends the pellucid and fertilizing waters of the beautiful Itchen, on whose banks the watered meadows give rich and frequently renewed food to fine flocks of sheep and lambs, as well as to cattle. The rich and exquisitely flavoured butter gives confirmatory evidence that water which will produce watercresses is highly fertilizing for grasses. I was g instances where the love for queer-shaped hedges, and abundant timber, had give more rectilinear and more profitable format shire scenery presented many charms to

Tiptree, May 5.

RECLAMATION OF LAND IN BANFFSHIRE.

MR LONGMORE, in November last, entered on a new lease of the extensive farm of Rettie, where he has for many years maintained his fine herd of shorthorns. A patch of 20 imperial acres of waste land, formerly under wood, at the north-west extremity of the farm, was included in the new lease, and five years allowed to Mr Longmore to bring it under cultivation. That spirit of enterprise which, for nearly half a century, Mr Longmore has exhibited in all his undertakings as an agriculturist, prevented him from taking advantage of the delay allowed for completing the improvement. The very day on which the new lease was signed, an invitation was written to contractors to trench and clear the ground of stones. In little more than ten days the reclamation of a most difficult subject was commenced, and within five months had been carried so far towards completion as to be mostly already under crop. An improvement of such extent and difficulty in so short a period has seldom, if ever, been accomplished in this county, and is certainly unparalleled on the extensive domains of the Earl of Seafield.

Mr George Still, Turriff, contracted for the trenching of the ground, and loosening of the stones with which it abounded, at the rate of £13, 10s. per acre. The trenching was done to the depth of 22 inches, the stones being left loose on the surface. The greater part of the soil is a strong clay, with open bottom. In some spots where the surface was covered with black mould, a hard pan was formed underneath, but when broken up revealed a fine open sandy subsoil. A great difficulty which the contractor had to contend with, however, was the unusual number and size of the boulders. Chains of immense boulders of blue stone run obliquely across the field from south-west to north-west, the intervening spaces having a thick sprinkling of smaller stones. In the belts of boulders, some of the stones were 6 yards square, and had to be bored and blasted with gunpowder; while very few of them could be removed without being broken up. The manner of splitting them is simple and efficacious. The stone is raised sufficiently to allow the air to circulate underneath it, when a peat fire is placed on the top, and in the course of an hour the block splits up in two or more places.

The removal of the stones from the ground and the building of a dyke round two sides of the complished by labourers employed by th work not being quite completed yet, the operations has not been exactly ascerta dyke is about a mile in length, is 5 fe tapers from an average of 4 feet broad at tion, to about 2½ feet broad at the top. to convey an idea of the quantity of ston from the field, when we state that less fourths of the quantity is sufficient mate building of a mile of dyke of the dimension

Yesterday (Monday) the stones were moved from 15 acres of the field, and passed over the surface, to loosen it for t of seed. To-day, oats will be sown, and a liberal dressing of guano. From the acres the stones would have been remov had there been any use to which they co but as they must be taken to a distance, t will be accomplished at leisure during t In the autumn, after the harvesting of th the whole field will be thoroughly drai being a fall from the centre to both side will be carried in the one direction to t and in the other to the thrashing mill. T be drained with 2-inch pipes, placed at from 3½ to 4 feet deep, and at distan about 30 feet.

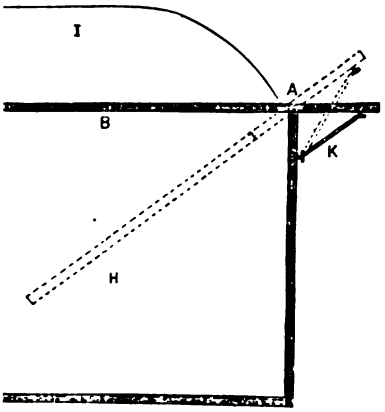
It is calculated that the cost of reclaim acres of land will not fall short of undertaking, however, was, as we hav exceptionally difficult, and proved muc than was anticipated. Its speedy acco while creditable to Mr Longmore, assum importance when viewed as a permanent the productive resources of the country.

Another feature which has marked this and one which we may note Mr Longmore when he entered upon it so late in the s employment it afforded to labouring me otherwise dull winter. Forty workmen we from the beginning of November to the e in trenching the field, and it is worth that a number of these gladly walked their homes in Macduff each morning an the work thus provided them.—*Banffshir*

Notes and Queries.

LXIX. VERMIN TRAP.

E are great pests to the nurseryman and eedsman ; and although numerous as are which have been invented for catching them, ır to fail in practice. We have now had siderable experience of a very simple trap, ation of a Mr Snook of Barrington, New ıich we cannot do better than to bring before



rs. The trap is in the form of a box, and ınk in the ground at places which are infest- se little pests. Rats may also be caught in a ap, made stronger than that we are about e. The box should be made of inch boards, : or some equally as hard, or harder, wood, to ıe prisoner from gnawing out. The side, I, 4 inches higher than the front, and tapering as ıe rear end, P, of the same height, and the full ı is the platform ; it is hung on two pins, A, ach side. The platform extends 4 inches e side, and in its lower side, near the end, ı nail, and also one in the side, which nails cted by a piece of rubber or other elastic ; the platform should be made of light mate- t should be tied to or laid upon the projec- for rats, fix the platform so that it will not d on it scatter some food ; in two or three ve the fastening, and when his ratship gets the distance from A to F, the platform will ave Mr Rat in the box, H, when the platform returns to its former position. The dotted ıit the position taken by the platform, B, d on by the animal. By this plan a number can be caught in the trap at the same time, and despatched as most convenient. This trap will be of service in trapping rabbits, and many other animals.

LXX. ON THE ADVANTAGE OF ROLLING YOUNG TURNIP PLANTS.

The following, from an able paper on turnip culture in the *Journal* of the Royal Agricultural Society, will be seasonable now :—"Another means of causing the plants to grow more rapidly at first is, to roll the land the first time it is in a favourable state, after the turnips are out of the ground, taking care, of course, to do this along the rows, and not across them, or you would bury part of the plants. When ridging was more common with my neighbours than it is now, one of them had got some land ridged for swedes, and was caught in this state by rather damp weather—that is, not sufficiently wet to stop the manuring, splitting the rows to cover it, &c., nor to prevent the turnip seed being drilled, although too damp to allow the land being rolled after the drill. He therefore went on drilling, with the hope that the weather would clear up and become dry, thinking that if it did he would have had an excellent turnip season. But during the second day the rain came down in torrents, making the land so wet that nothing could be done to it for several days, and when it had become dry it was too late to adopt the usual means of covering the seed : part of it had grown. About a fortnight was allowed to elapse after the plants appeared, to see the result, because during that period it was very difficult to say, what would be the best course to pursue. The land having been very finely pulverized before ridging, and the seed drilled rather deeply, the furrows or channels in the ridges seemed like the bottom of a dried pond, with scattered turnip plants, few and far between, no larger than they had been the last ten days, but less likely to grow, because there were flies on them, basking in the sun, and sheltered by the walls of hardened soil on each side of them. The land was cracking with sudden drought, and thus tending to retard the growth of the turnips ; but weeds, being of a more hardy nature, were both abundant and flourishing. In this state, as nearly as I can describe it, I found the field when my friend did me the honour to ask my advice as to the best means to adopt with respect to it. By my direction a number of men were immediately set to chop off the sides of the ridges with turnip hoes, so as to reduce them to a level with the turnip plants. The turnips were then rolled, which broke the soil around them to powder, and made the plants stand clear of the ground, and exposed to the wind. The space between the rows was then scuffled, and the field at once presented a neat and clean appearance. The beneficial effects of the plan here adopted exceeded my most sanguine expectations, and certainly was a matter of great surprise to all who witnessed it. The rolling which could not have been done before the banks of the rows were taken off, without burying the young turnips, not only put the soil in a better state, fastening the roots of the plants in a fine mould, but exposed the turnip to the wind, which accelerated their growth, not only by blowing them about, but by removing their greatest enemies—the flies, which, I have observed, are generally found in sheltered situations, or hollows in the soil. After the process above-named, it was evident that the means used would be highly beneficial, and in the two following days, the plants grew more than in ten days before; in short, they were soon ready to hoe, and by choosing a short period of damp weather to transplant a few, the field became a very excellent and full crop. From having seen the great and various benefits derived by this almost accidental rolling of plants on ridges, I adopted the practice of rolling them on level, when the season was favourable for that purpose, and can strongly recommend it for the above reasons, not only as having been my own practice, but as now followed by others, whose opinions are entitled to the highest respect. The roller used for this purpose was of oak, and about 9 inches diameter, divided into two pieces, to render it suitable for turning about, as well as to press the land more uniformly. It had shafts, and was drawn by one horse, although made as long as could go through a common gate-way. The description of roller used is of great importance, for the object is to obtain a decided and uniform effect on the surface, without fastening the soil too much below. Previous to hoeing, it is desirable to have the land horse-hoed as closely to the rows of plants as practicable, that the hoers may have directions to clean all the ground of weeds which has not been cleared already by the horse-hoe. When the weather is favourable, horse-hoeing will not only be useful in clearing away the weeds, but will make the turnips grow more rapidly, both before and after hoeing; therefore, whether there are weeds or not, where it is of great importance to have the crop as forward as possible, h[illegible]ation can scarcely be too often repeated [illegible] work is properly done."

[illegible] COMPOSTS

[illegible] gave a few remarks upon the subject of [illegible] yard manures. We will now consider that of composts, the materials of which they are composed, and the method in which they are formed and managed. The materials of which they are composed lie in most instances easily within the reach of the farmer, and in some are obtained at no great cost, from no great distance, and in all are

every way worthy of the close attention of the farme
from the manurial resources they place at his com
mand; nor should the point be overlooked, that ric
and fertilising constituents, as most of the substance
individually are, the value of the result in manure
when several of the substances are combined, is muc
higher than any one of the individual substance
This alone makes the formation of composts an essen
tial feature in the economical management of
modern farm. We have said substances are num
rous under the several heads of vegetable, anima
and mineral; many will be remembered by o
readers. The formation of the compost heap is
matter of some importance. There is no good reas
for the practice being adopted—and which, by t
way, is very commonly adopted—on the contrar
every reason for its being at once abandoned—of havi
the compost heap made up in layers, each layer bei
made up of a single substance. It is by far the b
plan to have all the materials at command mixed t
gether, and when thoroughly well mixed, added u
formly to and over the compost heap. Lime a
common salt are very valuable auxiliaries in the tre
ment of compost heaps. Lime, for use along w
vegetable and fibrous material, with road scrapin
weeds from ponds and ditches, and vegetable mou
Salt is extremely valuable as an addition to the co
post heap, especially when the manure is to be u
for the turnip crop. The following is a descriptio
Dr Bicknell's mode of forming a compost heap:—"
first thing is to secure a wide-spreading roof, and
prevent the wash of the rain, and the consequent s
tion and removal of the saline ingredients. Un
this roof must be accumulated vegetable refuse, we
leaves, turnip tops, stubble, ditch scourings, &c.,
loamy porous soil (the more porous the better), r
scrapings, old mortar, old cob wall, &c.; the ea
and vegetable matter being in about equal proport
by bulk. They should be spread about 3 feet in de
thoroughly mixed, and well watered with li
manure. In the course of two or three w
salt should be added, in the proportion of 1
to 20 or 30 tons of compost, and at this t
also, material containing lime, but not in a ca
state, forms a useful addition. Lime ashes sp
about and exposed for some days, being watere
old mortar, is the readiest way in which it ca
used. After these materials have been well mixe
the mass, which will have shrunk considerably,
be made into long parallel heaps, about 3 feet
and 4 feet wide, with a small space between e
and thus they must lie, watered from time to
with liquid manure, or prepared gas liquor, and m
from time to time with the fork to maintain
porosity, and supply them with fresh air for
een months, or thereabouts, when the prin
portion of the chemical changes will have
effected, and the heap will be ripe for use. The
the heap is moved the better, for by frequent m
alone can its porosity be maintained, and the

tact of air with the decayed particles of matter. Its movement will form useful occupation for farming men in bad weather; but it should never be neglected too long at a time. In watering it with liquid manure, urine, or gas liquor, care should be taken not to make it too wet, as that condition is adverse to porosity. The great object to be kept in view in its management is to maintain the constant contact in every part of the mass of air and water, of decaying vegetable matter, and the chemical materials. The prepared gas liquor may be used at two or three different times; it should be added, at least, in the proportion of 1 hogshead to 5 tons of compost; it will not be easy to add too much of it. The texture of the materials should be kept in the condition of moistish brown sugar. Managed in this manner, the material will be in a state to supply any crop with all, or almost all, the food required by its roots. To feed the cereal crops, it may, however, want one thing—viz., the phosphoric salts. Now, there is no cheap source for these most important constituents; they must be supplied by the addition of superphosphate of lime, or other known substances containing phosphoric acid."

LXXII. GAS-HOUSE LIME, AND THE AMMONIACAL LIQUOR OF GAS-WORKS.

These substances form a valuable source of manure, of which, thus far, but little use has been made. The ammoniacal liquor is very strong, and should be filtered through dry earth, or used to saturate earthy compost heaps, and even then had better be employed with some caution. Applied in its raw state, it is very likely to kill all vegetation. The refuse lime from gas-works consists largely of compounds of sulphur and lime, all or most of which are injurious to vegetation; but if composted for a few months with refuse matter, such as chips, sods, leaves, weeds, or other porous rubbish, the chemical changes which take place reduce it gradually to the condition, for the most part, of lime, and sulphate of lime, or plaster, both of which are beneficial; this refuse, so treated, would have a greater agricultural value than would freshly burned lime.

LXXIII. REMEDY FOR LEAKY TEATS IN COWS.

Milk three times a-day, say at five in the morning, at noon, and at eight in the evening. If this does not stop it, have a little collodion (which is gun cotton dissolved in ether), to be had of all druggists or photographers, and put a drop upon the end of each teat after milking, being careful not to touch it to a sore spot, or the cow will kick. The hole need not be covered except in extreme cases, for a little ring of collodion will shrink in drying and draw the hole together.

LXXIV. HOW DOES WATER GET INTO DRAINING TILES?

It leaks in. The soil outside of the pipe is saturated with water, which is pressing downwards, seeking an outlet. The open joint between the ends of two draining tiles is a crack through which it can find its way. Once inside the tiles, it runs off and leaves room for more to follow.

The Garden.

THE SUBURBAN AND AMATEUR'S GARDEN.

CHAP. XI.

PLANTS SUITABLE FOR WARDIAN CASES.

THE Wardian case is one of the best helps that has ever been devised for the growth of plants under difficulties. It brings within the reach of the city denizen an artificial medium, wherein plants do live and thrive, if not with great luxuriance, yet with a desire to grow and enjoy life. It is a valuable boon to all who choose to avail themselves of the privilege, the seeing plants grow under their own immediate supervision, and it calls forth a feeling of pleasurable excitement, new every morning. To the real admirer of this kind of natural beauty, the pleasure is enhanced by the difficulties surrounding it. To see plants in health, in the midst of cities and towns, where the sun is diverted by a multitude of opaque material from acting well its part, and the atmosphere enveloped in a perpetual hazy mist of smoke, eclipsing the light in the one instance, and poisoning the pure air of heaven in the other, is truly pleasurable; but how much more gratifying must it be to the actual possessor, who can point to every fern and club moss, and tell their probably chequered career from the date of introduction into that artificial home. The plants, in fact, became to enthusiasts identified with their being, and are treated as regu- [illegible] supplies as the new day dawns, or [illegible] the judgment of the possessor, as [illegible] necessity demands.

There is no special art in the production, or rather manufacture, of these cases, the name they bear being in honour of the gentleman, recently deceased, who brought them prominently under notice. They are simply miniature glass houses fitted into the windows of either drawing-room, dining-room, or parlour. Their ground form is generally an oblong square, with high parallel sides and ends, and arched over-head, with a little fret-work running along the top to relieve what might otherwise be characterized as an extremely formal, and rather an ugly, introduction into a window-sill. For lightness and durability, the frame-work should be iron; indeed, the whole skeleton work, including astragals, should be of that material. The object is to get as little obstruction to light as possible, and there is no better way of doing it than is forecast in the above suggestion. The whole affair is not very costly by no means proportionately so to some o the articles of furniture that often adorn rooms; and then, if success can be counted upon, what a grand investment for engaging and occupying the attention of the ladies o the household!

Many ladies and gentlemen unfortunatel do not know how to proceed with the furnishing of a case, even supposing they she some anxiety to hold such a thing in pos session, and hence what we should call laudable desire is prematurely blasted, and s many aspirants for spreading, by their exampl a love of horticultural taste are probably lo for ever. This is a state of things loudl calling for remedy, and we shall be at som pains to point out in this chapter how th whole thing can be managed, and that successfully, too, at no great cost. What w would enjoin, and what we do expect, is th some personal attention be given to th inmates of this horticultural prison, that the be not left unheeded; that in fact the sam considerate kindness that is paid to th winged race that delight us with the beaut of their plumage, or the sweetness of their song, should be observed on the part of the plants that are continually growing in interest and beauty throughout the season.

Let it be understood by every reader at the outset, that no flowering plant will yield its inflorescence to good account in this limited atmosphere. Not that the diminution of light is the prime cause, or even the beclouded atmosphere, for despite these drawbacks wallflowers or gillyflowers, and many annuals lighten up these walls of brick, and cement, and stone, on the outshot verandahs common in city building. It is the condensed moisture that destroys flowers so soon as they expand, and hence we must cast about for something of beauty of another kind less short lived. Nothing is more annoying and Tantalus-like to be within the reach of the object desired, and be destined to be disappointed. Beauty of foliage, therefore, must be in demand, and fortunately here we have no small choice. Some plants, in fact, delight in condensation and evaporation, warring with one another, and shew their sense of comfort by extending their dimensions in all directions. Nothing is so comfortable as ferns and club mosses in these cases, only there are species, and even varieties of these, that refuse to be coddled up and bathed in a continual flow of moisture. Our object, therefore, is to point out a few that have been tried, and well tried too, in the kind of climate that we are dealing with, so as the tyro may make an attempt on his or her own account, and learn by results the road to success. As this atmosphere may be said to represent a temperate clime, where the action of frost and its consequences are unknown, we will not confine our observations and recommendations to purely indigenous ferns, although, were we to do so, with the other plants which shall presently be adverted to, there would be ample material for furnishing a very large case. Our decided and avowed object throughout the work is to nominate plants easy of culture, cheap to buy, and not to overload our lists with names which would confuse any amateur, and perplex, more than instruct him, in the matter of selection.

Beginning, in the first place, then, with ferns, there are the races of Asplenuims and Adiantums that are particularly Wardian case plants. The maiden-hair fern (Ad. capillus-veneris), a true British plant, likes a quiet, still, moist atmosphere, and it has it here in its entirety; its lovely green fronds and the tiny pinnules that adorn it are objects of great attraction to the ladies. It delights in shade, being found in the interstices of rocks in Wales and Ireland. The Brazilian A. cuneatum is a well-known and easily cultivated plant, of a more gigantic stature than some others, and thrives well in window sills, shaded from scorching suns. It is particularly useful as a case plant, growing all winter. The Chilian maiden-hair (Adiantum Chilense) is another species that we can strongly recommend, the fronds having a glaucous hue, only it never grows very robust, coming in dense tufts. Ad. assimile, from Australia, is another one of larger growth, of a lustrous green hue, and furnishes a capital outline of form for introducing among bouquets of flowers.

Among Aspleniums there is, first and foremost, our sea spleenwort (A. marinum), which shews a disposition to do well in a case. As we said in a former chapter, its home is near the sea, and salt breezes seem to be favourable to its development; however, it is one that well repays attention in a case, and we cordially recommend it. The alternate-leaved spleenwort (A. germanicum) or alternifolium of some, is a very rare native fern, found in several stations in Scotland and in Wales. It is one of the small growing race, something like the wall rue (A. ruta muraria), or the curious and distinct forked spleenwort, (A. septentrionale). The New Zealand shining spleenwort (A. lucidum) is a most beautiful thing, hard to kill, growing rampant in a case, and well suited, therefore, owing to its pendulous habited lustrous fronds. Another charming fellow for this, from the same country, is A. flaccidum; it is of the liveliest green, and fine arching fronds add grace and beauty to its otherwise charming appearance.

Another family that bears the close at

mosphere of the fern case is Pteris, or the brake; hence braken, a name that is familiar to every reader. It is specially interesting to all fern lovers, moreover, because of the sportive, or rather the variegated character which some of the recent forms have taken on. The various shades of green are well represented in a variety of species, and the contrast which some of the variegations present are so decided and appreciable, as to afford much relief to the eye when inspecting a group of them. There is no better species for fern cases than the Japanese form of P. cretica, called P. c. albo-lineata, from the prominent distinct bands of white running up the centre of every pinnæ, or what would popularly be called leaflet, and then the pale green margins contrast so well with it. It is very patient under a variety of circumstances, and reproduces itself from seed in multitudes. Then, the silvery white-centred pinnæ of P. argyræa, shaded off irregularly with green, captivates every one, only the plant is a little more shy in succeeding in a case, but we have seen it often in beautiful condition. It requires a little more heat than most of these we have named, being an East Indian plant, but it thrives in a moderately cool close atmosphere. Then there are several forms of the Japanese P. serrulata, all of which are truly graceful, and interesting to every one. No one plant of any kind we know is so much at home in Wardian cases as these multivaried forms of the brake, and once get them established they are sure to give the tyro infinite satisfaction. The New Zealand P. scaberula is also a most welcome plant, emitting fronds from a creeping-like rhizome, or horizontal foot-stalk. Its beautifully attenuated-like segments excite much admiration.

Among odd species let us recommend the Killarney fern (Trichomanes radicans), which is one of the most beautiful of our native plants. Curiously enough, it has a wide geographical distribution, being found in the mild climate of Madeira, the variable climate of Brazil, and the West Indies generally. It delights to be bathed in moisture, only it is rather difficult for an amateur to grow, especially handicapp
with the difficulties incident to a purely to
climate. It is well worthy of a trial, ho
ever. Then there is Niphobolus rupestr
that lives anywhere where a little heat
provided. If suspended in a basket from t
top of the case it will turn its creepi
rhizomes in all directions, and then t
simple fronds look so peculiar, attached
these round rhizomes clad with chaffy-li
scales. The filmy ferns (Hymenophyllu
we could only recommend to those who ha
studied the culture for some time, as many
them are apt to die off in untutored hand
otherwise they are purely plants for the sha
nooks of Wardian cases. If any one were
set apart a case entirely for the growth
these filmy ferns, the most popular of whi
are Hymenophyllums and Trichomanes, th
we would recommend most of the tempera
ones; but where air and light are playing, as
ought to play where a general collection
attempted, this race of them refuse to do we
The only other fern that we will recomme
for the general Wardian case is the pre
evergreen Acrophorus hispidus. It is a dw
subject, but the beautifully cut dark gre
fronds render it especially interesting; a
like many of its fellows from New Zeala
this appears to thrive well in the case.

The club-mosses (Selaginella), or bet
known as Lycopodiums, bear sufferance we
There are four of them that are suitable
a life of confinement. First comes
wildenova, with very handsome frond-li
branches, nicely cut, and often mistaken fo
species of fern. Then there is the archi
branched S. umbrosa, which is quite as ca
vating as many of the newer and rarer spec
and then it seems to have a constitut
capable of no little amount of enduran
Then there is the changing-coloured
cœsium, which has quite a metallic lus
and creeps along the ground in a m
medium with considerable rapidity during
growing season. It requires to be preserv
or rather broken up, and replanted in spri
Then last, and not least in point of imp
ance, is S. denticulatum. Nothing is be
suited for edging the case or creeping up

ledges than this tufted-like club-moss. It is very dwarf, has very tiny leaves; and of a pale-green hue, evidently living well in our atmosphere, and on a diet which many would succumb to. There are many others of a more recent introduction that might be recommended, but those named above are sufficient for all ordinary purposes, and comprise among the most beautiful and varied of the club-moss forms.

If any other variety of foliage were in demand, ask for Tradescantia zebrina, which is very suitable, and has ornamental zebra-like foliage; moreover, a decoction of some of the species, boiled in oil, is said to be a useful antidote for itch and leprosy. Then there are the Dragon's-blood tree (Dracoena), the roots of which are said to be useful astringents, and the Croton plant (Codiæum variegatum) and its allies, from which a very acrid oil is extracted, might be introduced for ornamental purposes with success. Then some of the dwarfer palms, that are being introduced in greater numbers these last few years, would live respectably, putting in a nice appearance. Some of the pinnated race, such as Calamus Getah, and others of the family, are beautiful in a young state, and so are some of the Geonomas. In truth, we must call a halt, else the list will be open to the very objection that we are concerned in not seeing raised.

As to the management of the plants, how they are to be introduced, what soil is necessary for their well being, and whether there is t be a bed made for a general reception an covered over with stones,—a miniature rock work, in truth, under a glass shade, o whether each plant is to have a pot for it own accommodation, are questions that require to be dealt with. As a rule; in th limited area of a Wardian case, each plan had better have a pot for itself, only let it b concealed by inserting it in a bed of sphagnum and then artificial watering is not so ofte needed; moreover, the ungainly looks c pottery ware in a nicely furnished room ar conspicuous by their absence. If very choic tiny ferns are introduced, probably a prepare irregular knoll of rockwork would offer th best groundwork possible, because the pigm race could be inserted in the crevices toward the summit, and they would thereby hav more breathing room, and be better seen The Lycopods will come in well for fringin the margins, and some of the pendulous habited ferns might be suspended from neatl designed wire baskets. The Tradescanti too, makes admirable drapery, and so doe the Niphobolus. Then as to soil, nothin will do so well as fibry peat from the surfac of white sandstone, mixed with a little of th white sand itself. That mixture will gro any and everything we have recommended Only see that there is proper drainage, a convenient outlet for waste water, else nothin but defeat and discomfiture will be th upshot.

FERNS WANTED.

IT is stated that nearly a thousand exotic species of Ferns are at present in cultivation in this country, and that of these by far the greater number have been introduced during the last quarter of a century. Loddige's once celebrated collection of plants was rich in ferns, and at present there exists a very complete collection of them in the Royal Gardens at Kew; while among nurserymen the names of Messrs Veitch, Low, Backhouse, Williams, Bull, and others, stand conspicuous as cultivators and importers of thi favourite class of plants. Some twenty-tw years ago, Dr Seemann enriched the Kew collection with two very remarkable species, on of the Deparia prolifera, from the Sandwic Islands, now, we believe, lost to the country the other, Dictyoxiphium Panamense, fron

Panama. Mr Gustav Mann, who made several ascents of the lofty Clarence Peak of Fernando Po, found, at an elevation of 5000 feet, a fine new Cyathea, forming groups, with stems rising to a height of 30 feet; of this he sent specimens to Kew, but they did not live, therefore this noble tree fern still remains to be re-introduced. From the Ceylon Botanic Garden we have had the rare and curious Helminthostachys Zeylanica, which has since been lost to the country, and one or two other beautiful species. Many fine ferns have reached us from the Mauritius throûgh the instrumentality of Mr Duncan, the director of the Botanic Garden there; and Southern Africa is extremely rich in ferns; although, up to the present time, we possess few Cape species in our gardens. Natal has furnished us with Cyathea Dregei, a rare kind introduced by the late Mr Plant. Grammitis australis, once introduced from Australia, has, we believe, since been lost; but, as it was a species of no great importance, its disappearance is less to be regretted. Trichicarpa Moorei, a rare kind from New Caledonia, has also, we fear, disappeared from Kew; though it may still exist in the Dublin Botanic Garden, Neurocallis prœstantissima, from Dominica, is a rare and fine species; while from Trinidad come Schizæa elegans, a beautiful kind, but difficult to manage, and the fine Hymenostachys diversifrons. For Angiopteris Assamica, a species in the way of A. evecta, from Assam, we are indebted to the Messrs Jackson of Kingston.

On the Continent, ferns claim, as with ourselves, a large share of attention, and many of the collections there contain species even not yet in British gardens. Berlin at an early time possessed an extensive collection, and or Vienna ferns are also held in great repute, while from Mr Linden, of Brussels, our collections in this country have received large additions, some of which come from New Caledonia and the Philippine Islands.

Mr Smith, ex-Curator, Royal Botanic Gardens, Kew, says in his recent work on British and Foreign Ferns, 'that the total number of these plants cultivated in our gardens at the present day may be regar as forming about one-third of all the spec known to botanists by means of dried sp mens, and described in the numerous wo on Pteridology. Among the remaining t thirds are very many fine species, equal superior in merit, as garden plants, to any those we already possess. It may theref be worth while to mention a few of the m striking of these, together with those co tries in which they are found, in order direct the attention of some enterpris nurseryman to them, and induce them take steps for their introduction.

First, there is the magnificent Matc pectinata, found by Mr Hugh Cumming Mount Ophir, in Malacca, which only as exists in herbaria; in habit it resembles Gleichenias, but rises to a height of 5 c feet, with beautiful fronds, divided, like t of Fan Palms, into numerous pectinate ments. Dipteris Wallichii, an inhabitan the mountains of Silhet, and D. Horsfie a Java species are also worthy a place in gardens. In the Philippine Islands numerous fine species, such as Dryostach splendens, and Aglaomorpha Meyeni Lomagramma pteroides, with large pin fronds 3 feet high, Photinopteris H fieldii, of about the same height, Gleichenia excelsa, a species with fron or 6 feet high, having spreading pinnæ 3 feet in length. The beautiful Schizoc Brunonis of Penang and Malacca would form a striking addition to tropical ferne Remarkable for structural characters Sphœropteris barbata of Natal, and Diac aspidioides of Eastern Bengal and Java. other fern of Eastern Bengal worth notice is Acrophorus nodosus, a sing species, with pinnæ standing out almost zontally, or at right angles with the rachis. Khasaya, Silket Hills, Assam, Boc Sikkim, and other portions of the same trict, are also full of fine species of ferns unknown to our gardens. Kaulfussia samica, a remarkable kind, with trifo somewhat fleshy fronds, is well worth a tion; as is also the magnificent tree Alsophila gigantea, whose trunk in Si

Nepaul, and other parts of India, is stated to rise to a height of 50 feet! From Ceylon several interesting species have yet to be introduced, which would succeed in our temperate houses. Two fine tree ferns, known to exist there, are also worthy of notice—viz., Alsophila crinita, and Cyathea Walkerii, neither of which, as far as we know, have yet reached us. Many of the islands of the Eastern Archipelago likewise offer a fertile field for the fern collector. The Moluccas and Celebes especially possess large numbers of ferns, and among those in the former is the rare Cystodium sorbifolium. Even in European countries there are several ferns which we do not yet possess, as, for instance, Asplenium fissum, which is even rare in herbaria. In the Caucasus there is also the Woodsia Caucasica, an interesting species, closely allied to W. elongata of Northern India, and which might be expected to prove nearly hardy in this country.

From Mexico we ought to have many more ferns than we have; for, according to Fee's catalogue some 300 kinds exist there which are still unknown in our collections, and among these are several tree ferns; while from the more northern countries of the American continent growers of hardy ferns might obtain many things new to our gardens. Lovers of gold ferns, for instance, would be glad to have Gymnogramma triangularis, a species resembling Pellæa argentea in appearance, but larger, and covered, on the under sides of the leaves, with golden farina. This might probably prove hardy with us, and would be especially valuable. South America also offers a rich field to the fern collector.

The Fiji Islands, recently explored by Dr Seemann, are found to be rich in ferns, few of which are yet known in our gardens. Todea Wilkesiana, stated to be a "little tree fern," is said to be a highly interesting species, and there is also another Fijian—viz., Diclidopteris angustissima, which grows epiphytically on trees, with narrow grass-like fronds, varying from 6 inches to a foot in length, which English nurserymen should look after.

New Zealand has, we need not say, furnished our collections with many fine ferns, leaving little there now in the shape of novelty to be obtained, and the same may likewise be said of Tasmania; but as regards Australian ferns, about a third are stated to be still wanting to complete our collections from that colony. Of the latter, one is the rare Platyzoma microphylla, found on the borders of the Gulf o Carpentaria, specimens of which it would b very desirable to have. It is an extremely nea little fern, with rigid pinnate fronds a foo long, and scarcely an eighth of an inch i breadth.

Notwithstanding our already rich collections of ferns, it will be seen from what ha just been recorded, that many valuable additions have still to be made to them, and tha nurserymen have "work cut out for them in the way of introducing new ferns for som years yet to come. Most of the followin have already been in this country; but, a some of them are now lost, and as other are extremely rare, importations of them ar desirable—viz., Dicranoglossum furcatum, curious, pendulous fern, to be found in Tr nidad; Aconiopteris nervosa, an entir leaved sort like a Scolopendrium, to b found in St Helena; Pleocnemia Leuzeana, species with noble fronds many feet i length; Adiantum lunulatum, a trailing plan like a Hymenophyllum, but with the leaves an Adiantum; the New Zealand Lomari Fraseri, a slender-growing tree fern; Aspl nium lanceum, a Japan species with enti leaves; Loxsoma Cunninghamii, a New Ze land kind, with the habit of a Davallia; t rare and curious Kaulfussia esculœfolia, native of Java and other islands of the Eas Nothochlæna lanuginosa, a small rare Chilia fern; and Myriopteris vestita, a fine for from North America. Finally, there Thyrsopteris elegans, a rare tree fern, an i habitant of Juan Fernandez, the only pla in which it has yet been found. To t introduction of these, as well as of the oth rare kinds mentioned in the foregoing remark we would specially invite attention.—*Sea man and Nurseryman.*

Rambles by Road, River, and Rail.

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A TOUR IN THE WEST OF SCOTLAND.

LOCH INCH CASTLE.

WITHIN a few miles of Stranraer stands the modern residence of Loch Inch Castle, one of the seats of the Earl of Stair. It is one of the most imposing edifices, after the style of the Scotch baronial, that has met our eye. It is much more pretentious than, although a good deal after the character of, Buchanan Castle, the seat of the Duke of Montrose. The latter stands somewhat conspicuously on high ground, commanding admirable glimpses of the "Queen of Scottish Lakes," and a wide prospect of rural scenery generally, besides the foreground being richly adorned with rare and fine old trees; the former has not the advantage of an elevated site, nor is the prospect so rich or so varied, in the matter of trees especially, which at all times add a grandeur and a stateliness, if we may so express ourselves, to a landscape in connexion with the rearing of a palace, a castle, or a mansion of any size and importance. It has certain attractions, however, peculiarly its own. Looking to the castle as you drive along the highway, one would have supposed that the site had not been well chosen, for its comparative baldness of arboricultural dress. The want of large trees on the sea-board of Wigtownshire s painfully manifest, nothing in the forest ay withstanding the influence of the salt-vater breezes, unless it be evergreen oaks nd a few beeches that have attained considerable size, but bear marks of indisposition from their scraggy tops and lichened boles. ut the more you travel over the ground, nd look first at one place and then at another, the more you become impressed with he appreciation of the spot. It has this dvantage that it forms a sort of decided object between or at the apex of two ficent lakes—magnificent in respect of and in point of position very desi These lakes, the one designated the Loch, and the other the White Loch, cov spectively an area of 123½ and 120 acres the ground, well known, horticulturally s ing, that forms a sort of peninsula bet them, forms the Castle Kennedy ga pinetum, and pleasure grounds, extendin something like 73 acres.

Now, some landscape gardeners i taking initiatory lessons from the great B who wrote the beautiful "Essay on the lime," that no two separate pieces of should be observed from the same point; if possible some deception should be tised to make the two appear as one, or one of the pieces should be filled up gether. This is good enough designing w water is limited in extent, or where the forms a sort of continuation of the other placed as the lakes are at Loch Inch, f ing, as they do, sort of pendents to castle, and stretching in their extremiti points of longitude nearly equipoised, b point of latitude wide apart, in our opi they enhance the ground-work by being connected. At one period the whole grounds extending between Loch Rya the one hand, and Luce Bay on the o have evidently been under water, and t lakes, which cast so delightful a feature the Castle Kennedy grounds, must remnant of the tidal waters, as they are some 73 feet above sea level.

In addition to the attraction of the l the house is so planted as to command Island, from which the castle and parish names, the Castle Kennedy woods on sing slopes on the one side, and then netum itself, which is one of the great es of the place, and concerning which all have something to say in detail. The proprietor, and those who preceded within the last thirty years, have been ed with the necessity of remedying the ess that existed in times bygone, and and there, in fine undulating positions, irregular clumps of larch grow; some trees are springing up to clothe the -like surface, striking the eye forcibly on ling on the castle platform. In addition is, cottages for the principal servants, of a el character, strike the eye, standing out ell-chosen positions from the principal s, abundantly testifying to the kindly osition of this member of the aristocracy, evincing a desire to gather about him *in* those that he deputes to conduct opera- , and not banish them into concealed of-the-way corners, where less pretending less comfortable cottages might be in- d upon and erected. The landscape lener of modern times is more blameable the garden architect, for he will raise ctions to a leading of this kind, and con- r the appearance of even model cottages daub upon his favourite landscape. No- g artificial, unless it be spacious balus- les and fine statuary, are permissive on foreground of his pet designs. We demur too severe rendering of this landscape . It certainly would be incongruous to at down too many of them, but a moderate sion of the model cottage element is a p in the right direction, if the accessories properly laid down, and receive a proper re of attention as to keeping. That sort ermetically sealed-in exclusiveness, which sometimes cross, savours too much of a mitage—of a tenantless demesne.

The castle was founded in 1864, during lifetime of North Hamilton Dalrymple, th Earl of Stair, and completed by John, count Dalrymple, lord-lieutenant of Wig- nshire, and for twenty-five years member Parliament for that county, in 1868. It designed by Archibald Wardrope of Edinburgh, and is built with that fine white stone from the Preston quarries, that not only retains the colour, but becomes indurated from exposure. The stables form a sort of adjunct to the castle, being placed at right angles to it, and connected, it may be said, by a sort of junction wall.

The approaches that lead in several directions towards it may be said to be well designed, and the bending lines by no means incongruous to the eye. To our thinking, they are scarcely spacious enough in breadth, especially the south approach, to invest them with a corresponding character to what may be said to be an unique demesne—unique, in respect of the peculiarity of its various aspects of beauty, and the exotic character which its dress woodlands are fastly representing. By far the finest approach is that running past the end of the Black Loch, and leading towards Ayrshire on the one hand, and the "shooting box" on the other. During our visit, works were in course of prosecution to complete the junction of this new approach with the roads above referred to; and it was no easy task, for the "flow" moss, with its elastic bottom, swallowed up thousands of carts of gravel and soil—so much so, that a deep cutting, not unlike that which is often seen in railway undertakings, was scarcely sufficient to supply the seemingly treacherous bottom of this Black Loch. Nevertheless, as Mr Fowler informs us, all is now satisfactorily completed, and the north approach will be one of the finest things in roads or drives about the estate. It not only has considerable length to recommend it, extending as it does in a straight line for nearly a quarter of a mile, and then gracefully bending east and west, as above noticed, but it has the proper accessories. Many great authorities, even Repton and Loudon, objected to a straight line, preferring, if possible, a deviating one, only correctly enough insisting that the landscape gardener should never forget, in laying out his plans, that the approach should be as direct a road to the house as practicable. This is eminently correct teaching; for to say nothing of the desire of a messenger to make for a straight road between two points, it is not only fastidious and finical, but decidedly incongruous to go, as some may put it, "round about seeking the nearest." Of course, proper entrances from highways or parish roads should be fixed upon, and all the better certainly if curvature lines take precedence of straight ones, suited to the undulating character of the ground, in making for the principal object or focus—the mansion-house—of any design. To have attempted in the north approach to deviate from the straight line on tolerably level ground and scope of grass on either side, would, looking to the point where crossing the lake was imperative, have been unquestionably bad taste, and therefore we have to congratulate the designer on this part of his work. What enhances the effect is the broad grass alleys that are partitioned off on either side at some 24 feet width, the road itself being of similar dimensions, narrowing at the junction. A substantial wire fence, of about 5 feet high, marks off what is intended to be under keeping with the lawn mowers, from that of pasture for sheep and cattle browsing.

The approach on the south is that leading from Stranraer, and to it there are some patent objections, which we may be excused in noticing. It is guarded by what must turn out, when finished, to be a spacious entrance, with suitable lodge, having the additional proof of security in a good substantial wall running east and west. It has been well said that a well-designed approach is a "characteristic ornament of art," and we pass along admiring the outlines of the one in question a little dissatisfied with its want of breadth in a spacious park; but our dissatisfaction culminates as we approach the castle and ascending t[illegible] gradient confr[illegible]

vestibule, nor any of the salient ought, and are, to be seen of the but that of the arching-like pe forms a centre-piece to the bloc placed at right angles of the m the castle. Constructed as the c looking to the entrance-gates on there is some difficulty certainly in two evils—the one, the length of a proper change of way would nec the other, the avoidance of con stables. Be this as it may, until some way, it will be a blot upon work of the pleasure-ground. ing in an easy gradient in a s westward, very great improvem landscape gardener's point of vie the result. In getting the verge to the eye," to tally with undulat without interfering with its kn great point in all designing. To seeming obstructions, and run th way-like, is very questionable tas such a barbarous system was well

The block on which the castle a high platform, the ground rec wards towards the famous Whit series of terraces has been formed with a handsome balustrade wall, with rich stone ornaments, and t the interior is grounded with gra contemplation to have a flower-out in proximity as a subsidiary, an are being formed as nurses to choice plants as may in conseque duced.

Concerning the general planta estate, the vast collection of cc other matters, we must reserve ssues.

Plantations and Hedges.

*JAPANESE COFIFERÆ.**

BY ROBERT HUTCHISON OF CARLOWRIE.

RYTHING that is remarkable for eauty and interest in the Flora and the British islands at the present be traced to a warmer climate. As ucts of the far East have contribut- ommercial point of view, along with every clime where British enterprise ital have penetrated, to enrich our wealth, so the Flora and Sylva of untry to which the flag of England carried, have assisted, to an extent t is impossible to exaggerate, to h the scanty Sylva of the British

this is true of flowering and half- rbaceous plants, it is no less the case ubs and trees, whether evergreen or us. And confining our remarks in ent paper to coniferous and evergreen d shrubs of more recent introduction, sequently of less thoroughly acclimature and tried hardiness, we may be d if we speak of the various Japanese ith somewhat of reserve; for, owing short time these have been in culti- n this country, though they seem to eeding well, and proving valuable es to the arborist in his selection of and beautifully foliaged trees and t is quite possible, although, we think, ble, that upon a more extended d wide-spread introduction, some e we name and quote as having proved hardy, may result in partial

ntroduction of what are now popularly the newer coniferæ," may be classed under six epochs. And although, properly speaking, the dates of these periods go back into years which can hardly, with strict propriety, be termed "recent," it is better to embrace the whole catalogue of coniferous trees flourishing as, or destined to become, timber in Scotland at the present day, in one classification, than merely to notice the new varieties of coniferæ, whose introduction into this country has taken place within the last forty or fifty years.

Starting with the fact that the only indigenous conifer in Scotland is the Scotch fir (Pinus sylvestris), we find that the first additions made to this solitary cone-bearer were brought to this country from about the middle to the end of the sixteenth century, when we find notices of the existence of the Norway spruce (Abies excelsa), the stone pine of Italy (Pinus pinea), the cypress of Southern Europe (Cupressus sempervirens), and the pinaster or cluster pine (Pinus pinaster); and with the introduction of the larch (Larix Europæa), which took place about the year 1600, we may close the first epoch in the cultivation of coniferæ in Great Britain.

The second epoch in the history of the attempts to cultivate the pine family in the British islands, may be dated from the introduction of the silver fir (Picea pectinata), from the European continent, in the year 1603. This second chapter in the lives of the coniferæ is remarkable and interesting, as containing the first notice of specimens brought from beyond the limited confines of Europe; for, shortly after the arrival of the silver fir in this country, we find mention of the existence at Kensington of the deciduous or Mexican cypress (Taxodium distichum

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efore the Scottish Arboricultural Society.

Mexicanum); and about the same time, or a few years later, about 1665, the arrival is chronicled of the East Indian cedar of Goa, and also of the now well known cedar of Lebanon (Cedrus Libani).

From the beginning of the eighteenth century we date the third epoch in the history of the introduction of rare coniferæ, when a new field presented itself in our American colonies, whence to draw these novelties, and to gratify the taste for them which was now thoroughly awakened throughout this country. This third epoch contains probably the most valuable acquisitions yet received, if we except those of the *first* period, which, being from the adjacent continent of Europe, and experiencing comparatively little change of climate or geographical position, have all proved quite as hardy as the native Scotch fir; though, indeed, geological discoveries seem to render it probable that in remote eras these conifers were also indigenous to the British islands. To this epoch we refer the introduction of the following species and varieties:—

The white spruce—Abies alba, in 1700.
Black spruce—Abies nigra, in 1700.
Weymouth pine—Pinus Strobus, in 1705.
Frankincense pine—P. Tæda, in 1713.
Banksian pine—P. Banksiana, in 1730.
Hemlock spruce—Abies Canadensis, in 1735
Jersey pine—Pinus inops, in 1738.
American larch—Larix microcarpa, in 1740.
Prickly pine—Pinus pungens, in 1740.
Red spruce—Abies rubra, in 1750.
Resinous pine—Pinus resinosa, in 1750.
Pitch pine—P. rigida, in 1755.
Corsican pine—P. Laricio, in 1760.

A long interval now elapsed, in which [illegible] [illegible] been directed to th[illegible] [illegible] [illegible] noteworthy varieties introduced. A[illegible] [illegible] time, however, we notice the comm[illegible] [illegible] of the third and most important [illegible] [illegible] the interesting account of the transference of new species of coniferous trees to this country from foreign climes; for to this date we trace the first notice of the now well known and universally appreciated deodara. The importation of this pine from the Himalayas of India' impetus to further research; and as afforded by the East India Company a large supply of seeds, while the value of the timber of the deodara wa ted as a fact, and its hardiness seemed doubt, several other varieties of Hi coniferæ and evergreens soon f And about the same period, if not years earlier, we find mention of th Pallasiana, P. Calabrica, and P. Can P. Austriaca, P. pyrenaica, and Picea lonica, P. pichta, and Abies Khutrow

The fifth epoch contains those introduced from California and Mexi embraces the many important additio to our Pineta from these countries, the years 1830 and 1855, the hi whose first appearance need not more fully detailed, existing as it doe memory and experience of many of sent generation of foresters and plant comprising the well-known names of–

Pinus ponderosa,	.	1828 to
Abies Douglasii,	.	1828 to
Pinus monticola,	.	1830 to
P. Lambertiana,	.	1828 to
Picea amabilis,	.	1830
Picea grandis,	.	1830
Picea nobilis,	.	1830
Abies Menziesii,	.	1832
Pinus Sabiniana,	.	1832
Picea bracteata,	.	1833
Pinus insignis,	.	1834
Taxodium sempervirens		1840
Wellingtonia gigantea,		1852
Cupressus Lawsoniana,		1853

The sixth and last of the great epo [illegible] divide the narrative of the [illegible] introductions and researches af [illegible] pines likely to prove har [illegible] to the climate of Great Bri that which more especially concerns t ject of this paper. It comprises the more recently introduced from Japa beautiful and attractive as many of th zens of other localities have provec ed with the commoner shrubs in try, we find amongst these later rees whose tiny heads are making npts to start into hardy habits, and mise that at no distant day they as valuable and useful acquisitions ich our pleasure-grounds and wood- e previously received from other

eak of the thorough hardiness in of the lately-introduced Japanese and evergreens would certainly be , inasmuch as many of the young red from the seeds sent home by Mr e, and his able rival in arboricultural Mr J. G. Veitch, have had too short the open air to judge of their ability nd our long winters and short sum- t in so far as we have had opportuni- dging, we think it may be safely at most of those introduced have ardy, and with ordinary care in suitable sites, and giving proper until they become acclimatized, every probability of their intro- to any collection proving thoroughly ; while their fine foliage, distinct d novel appearance, render them irable for every Pinetum, and gene- ctive to the most cursory observer ulture.

he commercial treaty of 1854 opened ese ports to British commerce, the hat country was comparatively un- us; but since that time, sufficient e of the country has been obtained in that it is rich in many trees adapted for cultivation, either ental or profitable timber, in the slands. Nor is there anything in aphical situation of Japan, or in the the climate or soil, to induce the the further and more extended in- of these would be attended with r result than a successful one. the experience of previously intro- cimens from other countries before le us, in the present case, in treating hose strangers to our climate, whom o adopt and nurture as natives; and if we look at the position of Japan on the globe relatively to our own, we may confidently state that no enterprise gives greater probability of triumphant success, than the introduction of many of the Japanese coniferæ.

It may be necessary to recapitulate briefly a few of the more interesting physical features of this hitherto comparatively unknown country, as bearing upon the probability of such plants as suit its soil and climate, and are indigenous there, being found likely to thrive in the soil and climate of Great Britain.

Situated between latitude 26° and 50° North, and longitude 128° and 151° East, the islands of Japan are exposed to terrific hurricanes. This position in latitude does not differ materially from that of Great Britain, which lies between 50° and 58° North. The situation of both countries is insular—another important feature taken in connexion with tidal currents affecting similarly the vegetation of both. A chain of mountains traverses the islands, which have their summits snow-clad for several months in winter, with a few permanent patches, such as may be seen in some of the crevices of Scotch Highland scenery. Though the character of the country is mountainous, the elevations are generally moderate, and are either cultivated to their summits, or clothed with woods. In the plains of the volcanic region, the earth is generally a rich loam, several feet in depth, without a stone, rendered even more fertile by the liquid manure from the towns. The rest of the soil is sand, enriched by careful manuring. In the northern island of the Japanese group, the winters are long and severe—snow lying from November till May—while the summers are hot. In the southern districts, the winters are milder and of shorter duration. In the variety of its coniferæ, and the large size to which they attain, there is a strong resemblance between Japan and the opposite coast of North America, whence we have obtained so many species, which have proved quite hardy since their introduction into Great Britain; while the greater depth of the soil in Japan induces the belief that the pines brought from that country will prove more tap-rooted, and will take a deeper hold of the soil than many of their American brethren, which are very shallow or surface-rooted, and that they will, therefore, be much less liable to suffer injury from the strong winds which prevail in this country, and which have always proved more fatal to the American pines than the severity of our winters has done.

We have said that the instances of successful introduction of the Japanese coniferæ are few, but we should at the same time mention, that where they have been fairly tested they have fulfilled the expectations entertained of them; and, among other examples, we may name the following places where they prove satisfactorily hardy:—

1st. At Rockville, Linlithgowshire, at an elevation of from 220 to 250 feet above the sea level, and upon good soil, inclining to be light, with subsoil of whin-rock and clay, there are fine specimens of the following varieties:—

	Age.	Height.
Cryptomeria elegans...	6 years	6 feet
Cryptomeria Japonica	13 "	15 "
Cryptomeria Lobbii...	6 "	6 "
Thujopsis dolabrata...	8 "	2 "
Taxus Japonica..........	13 "	2½"

There are also fine plants of Cephalotaxus Fortunii, 5 feet high—Juniperus rigida, Retinospora leptoclada, Retinospora obtusa, Retinospora pisifera argentea, and Retinospora pisifera aurea, Sciadopitys verticillata, Thujopsis lætevirens, and Thujopsis Standishii.

These [illegible] have been obligingly furnished [illegible] Rockville, [illegible]meria [illegible] rapid [illegible] our, [illegible] also [illegible] promises to be very [illegible] and distinct. The Retinospora aurea and Retinospora pisifera are proving quite hardy, and from their very desirable colour and foliage are vast acquisitions to gardens and pleasure grounds. The Sciadopitys verticillata is in this situation, as others we have observed, making very lit progress. The finest specimen of t variety is to be found at Osborne. It is o of the originally-introduced plants sent ho by Mr Fortune, and is now about 2 f in height.

2d. At Sloggery, near Castle-Douglas, e vation above sea level 300 feet, and in loa soil, there are healthy and hardy plants Retinospora obtusa, 6 inches in height, a Thujopsis dolabrata, 15 to 18 inches height. They were planted in 1866, a have stood successfully the very severe fr of March 1867, when the thermome ranged at 14° in that locality.

3d. At Mountsuart, in Bute, the Japan pines seem suited to that climate, and well.

4th. At Durris, in the county of Kinc dine, where there is one of the most extensi and valuable collections of coniferæ to found in Scotland, the Japanese variet have been introduced with great and sig success; and although as yet many of specimens are quite small, and are growing fast, still their hardiness is doubted. Growing there at an elevation 300 feet, in a light loam, upon a subsoil clay and granite *debris*, we find the follow sorts in a healthy and thriving state:—Ab Tsuga, eight years planted, and now 15 f high; Cryptomeria Japonica, eight years and 14 feet high; Cryptomeria viridis, se years old, and 9 feet high; Cephalotaxus F tunii, seven years old, and 3 feet high; Reti spora pisifera, two years old, and 3 feet hi Retinospora ericoides, five years old, an feet high; Retinospora obtusa, two years and 3 feet 7 in. in height; Thujopsis dolabr four years old, and 2 feet high; also sma plants of Abies polita, Pinus Koraien Pinus densiflora, Sciadopitys verticill Thuja falcata, Thujopsis lætevirens, Thuj sis Standishii, and Taxus cuspidata.

The following varieties may be classed of doubtful hardihood, from the experienc them at Durris:—Abies Kæmpferii, Pi Fortunii, Cunninghamia sinensis, Junipe rigida, Retinospora leptoclada, Retinosp lycopodioides, and Retinospora squarrosa. The last-named plant dies off unaccountably, although it seems hardy during winter. The Abies Kæmpferii grows too late in autumn, and does not ripen its wood well in this situation.

5th. At Carlowrie, Linlithgowshire, in fine deep loam, on a clay subsoil, and at 92 feet elevation, the Taxus Japonica, is 2 feet high; the Cryptomeria Japonica, four and a-half years, and 2 feet high; the Cephalotaxus Fortunii, 3 feet; the Juniperus fragrans (?), 4 feet; and the Cupressus majestica, 2 feet, have all proved quite hardy; while the Pinus densiflora, when four years old, and 2 feet high, died off most unaccountably in an open situation in the middle of summer. The Sciadopitys verticillata is quite hardy at Carlowrie, but a very slow grower. The Thujopsis dolabrata is perfectly hardy, and a great acquisition, indeed one of the best of the Japanese pines; and Retinospora pisifera aurea is quite hardy, and very fine.

6th. At Tortworth Court, Gloucestershire, with an elevation above sea level of 250 feet, upon the old red sandstone and mountain limestone, and on a varied subsoil, we find Lord Ducie has been successful with many of the Japanese pines. For example, the Picea firma, is 2 feet 6 inches in height, very healthy and quite hardy; Abies polita, 2 feet high, also thriving, and of rapid growth; Abies Kæmpferii, ten years old, and 5 feet high, quite healthy and hardy, but slow of growth, and not altogether satisfactory; Cryptomeria Japonica, sixteen years old, 30 feet high, very healthy, quite hardy, of dense habit, and rapid growth in moist soil; Cephalotaxus Fortunii, six years old, and 5 feet high, is quite healthy, of moderate growth, and prefers a moist soil; Retinospora pisifera, four years old, and 5 feet high, is quite hardy, and suits the mountain limestone soil; Retinospora squarrosa, five years old, and 4 feet high, is very healthy and quite hardy, of dense habit when young, but becomes open and branching afterwards. From this station we have likewise returns of Retinospora obtusa and Thuja falcata, both of which are very healthy and free growers but they are rather small for particula notice.

7th. At Rosehall, Falkirk, elevation 16 feet, on a free loamy soil, we find Cryptomeria Japonica not quite hardy. The sam remark applies to Cryptomeria viridis, an we are informed that the Cephalotaxus Fo tunii is a bad grower. The Cryptomeri elegans, five years old, and 2 feet in height, i healthy, but very apt to get its young woo destroyed in spring and autumn. In thi locality, although of slow growth, Retinospor leptoclada, and Retinospora squarrosa ar quite hardy, while Retinospora pisifera, 5 year old, is now 4 feet in height, perfectly healthy a handsome conifer, and very hardy, indee one of the best of the Japanese importation Of the variegated varieties in this collection we may notice as thriving remarkably well the Retinospora pisifera argentea, and Retinospora pisifera aurea, both of which are pe fectly hardy in this locality, great beauties and ought to be in every collection. M Neilson considers that these are the mos handsome conifers which have come fron Japan. Retinospora obtusa, five years old, an 4 feet high, is now a great beauty, and pe fectly hardy; Sciadopitys verticillata, five year old, and 1 foot high, is quite healthy, but very slow grower; Thujopsis dolabrata, eigh years old, and 1 foot high, is very health and handsome, but of slow growth; Taxu Japonica, ten years old, 5 feet high, is ver healthy, remarkably fine, and "a gem of th first water."

Although the foregoing examples of su cessful treatment of the Japanese pines mig be multiplied, we think that in the prese early stage of the introduction of these plant enough has been adduced to prove the hardihood, and to encourage others to te their suitability to our climate. In conclu ing our remarks upon this very interestin subject, we may be permitted to name t following varieties of Japanese coniferæ worthy of the notice of every admirer of the beautiful trees, all of which, we think, jud ing from present experience, so far as goes, are likely to prove hardy, and suited to the climate of Great Britain:—

Abies polita.
„ Tsuga.
Cryptomeria elegans.
„ viridis.
„ Japonica.
Cephalotaxus Fortunii.
Juniperus rigida.
„ fragrans.
Picea firma.
Retinospora pisifera.
„ „ argentea.
„ „ aurea.
Sciadopitys verticillata.
Thuja falcata.
Thujopsis dolabrata.
Thujopsis lætevirens.
„ Standishii.
Taxus Japonica.

Of the newer Japanese coniferæ, thos which deserve to take the first place a favourites in this country, are—Thujops dolabrata, Taxus Japonica, Juniperus fr grans, and Sciadopitys verticillata; and i as we anticipate, these Japanese novelties a found upon further trial to fulfil the expect tions entertained of them, they will soon qui alter the face of the Scotch gardens and ple sure-grounds; and, in the words of Mr Isa Anderson-Henry, whose admiration of all th is novel and deserving of cultivation in arbo culture is well known, "Oh, that we mig live to see it!"

ON INCREASING THE COMFORTS OF UNDER-FORESTERS ON LARGE ESTATES.

BY CHRISTOPHER YOUNG MICHIE, FORESTER, CULLEN HOUSE.

IT would be difficult to over-estimate the claims and importance of the above subject.

Neither logic nor mathematics are necessary to prove the intimate and inseparable connexion which subsists between a duly qualified or disqualified forester, and good or bad forestry. Even those who lay no claim to abstract reasoning soon arrive without difficulty at the settled conclusion, that, wherever forestry is skilfully and judiciously executed, it [illegible] qualified forester [illegible] [illegible] our imp[illegible] conveyed [illegible] the eye is the [illegible]fest and [illegible] to be relied upon; how often [illegible] the most shrewd and observing of men misled and deceived on engaging their s vants by misjudging their qualifications.

Having only spoken with a man, scrutinis his autograph, the master is satisfied with a engages him, but soon finds by experie that he is far deficient of what he anticipa Such common but unpleasant results neither the fruits of wilful deception the one hand or want of penetration or crimination on the other, but simply that ests are imperfect and too superficial to rev [illegible] true man, and make known those ne [illegible] and essential facts as to whether the n [illegible] mere gifted speaker and elegant wri [illegible] practical in the other and more imp [illegible] respects.

Though elocution and penmanship [illegible]ts of no mean order in their way, especi n literary appointments, yet they occupy o inferior and subordinate place in fores hence the person chosen upon one or bot these points of merit may be literally disq lified for the general duties of forestry.

qualification tests for foresters may, however, be made the subject of a separate essay, nothing further need be advanced respecting it here. Before enumerating the qualifications necessary for a first-class forester, it may be well to look into the nature of the duties he is called upon to perform in the line of his profession.

The duties of a forester, abstractly considered, may be presumed to consist in the art and practice of growing forest trees. The culture of forest trees is a subject amply sufficient to occupy and engage all the time and talents of the most gifted and energetic men of the age whose span is limited to "three score and ten," without distracting or dividing his attention with other matters. Where men have excelled in any science or profession, it has invariably been where they have steadily and perseveringly pursued one branch of it; and it is evidently a true fulfilling of the common proverb, "Jack of all trades and master of none," that the low tone of forestry is what it is, as seen in our poor but neglected plantations at the present time. The duties of the forester probably ought to begin with the seed or seedling, and end with the cutting down and sale of the timber crop, embracing all the operations intervening between these extreme points. We have heard a respectable forester say that his greatest ambition and pleasure lay in cutting down fine timber trees. With all due respect to such ambition and pleasure, we must say that ours differ in the opposite extreme from his. Few breeders, or even feeders of stock, would admit that the slaughtering and dissection of their cattle were their greatest pleasure and delight. It is yet in the memory of some men living that a carpenter was considered a skilled forester who could select and cut down the trees most suitable for his purpose and trade. It is also fresh in our own memory that a man stood high in his calling as a forester who could dexterously impound sheep or cattle, or frighten a country schoolboy in quest of his favourite bow and arrow, bullet gun, or whistle wood. We have happily outlived these good old times, and raised a standard higher than that of our forefathers; yet there is much to do. Untrodden paths are yet to traverse, an heights to ascend, before we reach the go of human perfection, which term signifies a high as the scale of manly perfection wi allow him to arise.

The first thing required of this paper is t shew the best means of increasing the comforts of young men as foresters on larg estates. The suggestion of the requiremen in the first place, presupposes that their comforts are, to some extent, incomplete an defective; hence that certain aids and supplements are required to meet them. To lay dow an abstract rule, or erect a model standard c what true comforts are, would involve endles difficulties, increase bitter dissensions, an multiply serious objections *ad infinitum;* an the writer would, in all probability, leave th subject more vague and unsettled than whe he first began. Believing that a faithf account of what several eminent and no first-class foresters have undergone, who onc occupied the position of apprentices, an wrought upon large estates, together with a embodied experience of the writer's, will b found a great auxiliary, if not the desideratum under this head.

First, we may look at the term and condition upon which apprentices should b engaged; second, at the age at which the should enter the duties of their apprenticeship; third, how their time should be employed during the term of engagement fourth, the obligations of the apprentice t his master; fifth, the obligations of the maste to the apprentice; sixth, shew some c the objections to the present mode c granting certificates of character; seventh the wages and means of support necessar for the comforts of a young man. First, th terms of an engagement should be three years and made without any formal or legal forr of writ. The writer's personal experience i against all such written agreements. Th following are amongst his reasons of objection to them:—A lad of an amiable disposition, and easily led or influenced by other less well-disposed, is easily made to believ that his duties are too arduous or irksome and that he is generally worse treated tha his predecessors were, or than he himself deserves. In such cases he is further advised critically to examine the letter of the *written term of agreement*, and by doing so he would, as a natural result, be led to construe certain clauses and unduly emphasise others; thus quarrels and disputes would arise as the inevitable consequences. So that paper agreements between masters and servants are too flimsy and tender to be relied upon in binding them together, and more frequently form bones of contention and strife, and not unfrequently lead to litigation and other evils. We have heard youths speak of *civil law, police acts, &c.*, in such a manner as if they regarded them as the true and only standard of right and wrong. If their views of law chanced to be right, they might also be so far right; but if their notions of law were wrong, which is more likely, they would equally and conscientiously do what was wrong just because it was law. The extreme opposite of this course is that which the writer would recommend. Written terms he has no objections to, as such, but only objects to them on the grounds above stated, believing them to be only valuable as statements relative to wages, times of payment, term of engagement, and such like. An apprentice forester's agreement should not assume the character of an indenture, but simply constitute a memorandum that each party may be enabled to recall his obligations to the other. The terms, however, whether verbal or written, should be plain and commonplace, and divested of legal terms and phrases. All are the better of being reminded of their duty at times, but should never be led to discharge it as a legal obligation or because certain clauses inculcate it.

On the [illegible] where the writer [illegible] ne agreement was [illegible] met all the [illegible] wages named were [illegible] second [illegible], and [illegible] general workmen on the estate [illegible] had 11s. per week. In addition to the weekly wage (upstanding), £1 extra was allowed for the harvest month. The usual workmen upon the estate were either allowed absence of o month for the harvest or £1 addition monthly wages. The apprentice who w also retained from the harvest general devoted his time during that month pruning. This was found both a good ti and opportunity for pruning operations, unless such work had been thus overtak the probability is that it would not have be done at all, and the trees would thus ha materially suffered for want of it.

At the expiration of three years, the spe fied time of agreement, the apprentice w allowed about four months to go to a pub nursery in order to gain further experie and practice in the culture of plants a nursery work generally. At the expiry the four months, more or less, he again retur to his former occupation and employme and now took his turn at the ordin work along with the other workmen. more difficult departments were, howe more frequently allotted to him, such certain kinds of nursery work, prun erection of palings, hedge cutting, &c. junior apprentice being generally enga shortly after the senior one left for the pu nurseries referred to, and at his return junior apprentice accompanied him gener at most works, who was privately instruc by the master to impart all the informa to him he possibly could. By this me the young apprentice got early initiated into the art and practice of many branc of forestry, and thus escaped a very gen evil—that of first being allowed to do thi wrong, and afterwards having to unde the ordeal of doing them right. In capacity the journeyman remained a lo or shorter period, seldom less than three ye at the expiry of which he was considere to take a foreman's place, and in some c even a situation of higher trust and cha At the end of six years, when the jour man continued further to remain and fill situation of foreman, he had from 2s. to per week more wages than the gen workmen. As foremen, they usually c tinued two years, when they sought o situations in order to promote their so condition and gain experience. Having by this time fully demonstrated many traits of their disposition, the master was enabled to furnish them with certificates of character, &c., setting forth their steadiness, truthfulness, honesty, industry, perseverance, ingenuity, and all with considerable confidence as to their verity; and having earned an important certificate, and one that would either do him much good or harm in after-life, according to its merits, which the master faithfully and fully supplied according to the solemn terms of moral obligation, which means stating the truth, the whole of it, and nothing but what is true. The foreman now, thus furnished, looks out for a change of situation, and obtains one only as a workman upon an estate of considerable extent, under a forester of known ability. It is better to go as a common workman at first, and if he remains over one year he might be eligible for a foreman's place. If, however, such is not vacant, he may continue to remain a little longer. High wages or power ought only to be secondary considerations compared with that of acquiring experience, which must be procured even at the sacrifice of comfort. Pecuniary matters ought not to weigh too heavily in the scale against experience and proper instructions.

The age at which an apprentice should enter upon duty will depend to a considerable extent upon his physical strength, having to enter upon rough toilsome labour, and often to perform long fatiguing journeys, as the work of foresters generally lies detached and wide apart; also, that his labours may not be felt oppressive, he requires considerable muscular strength and agility. The money wages, too, must be adequate, and sufficient to support and maintain him, if guided by frugality and strict economy.

Seventeen or eighteen years of age appears a very proper time for engaging an apprentice, as shewn by these, and other reasons, which will appear in the sequel. The way in which an apprentice should spend his leisure time is a matter of paramount importance, and it is in reference to this more than any other circumstance that the master has to exerci judicious authority and due command.

Many rules might be laid down, and all them good, but in this, as in other prescri tions, they would likely all differ and she each their respective points of weakness ai defects. We have thought the best means enabling a young person to husband his tin is, to induce him to lay down what may l called a working plan for the complete e gagement and occupying of it. To shew th this proposition is not singular, new, nor e tirely of the writer's own conception, he su joins the following lines of the immortal Pop who says—

> "Without a plan my moments run to waste,
> Wild are my wishes, wanton is my taste;
> Without a plan mere inclination rules—
> The fluctuating quality of fools;
> Without a plan the understanding sleeps,
> The memory's loaded, and the judgment weeps

We would recommend two sets of rules f the spending and employment of time: one f the summer months and another for winte As we regard the observance of these rules a great means of a young man getting on the world, we subjoin them at further lengt First:—'Rules for summer'—Rise as tl clock strikes five, if work is resumed at si and at six if resumed an hour later; this ru is subject to gradual variations as the da lengthen or decrease. As an extraneous supplementary means of fortifying and strengt ening the resolutions of a young man for pun tual rising, especially in cold weather winter, we would recommend him, on awa ing, to *inhale* his breath to the full extent, the same time firmly resolving not to *exha* it till he does so out of bed, with his feet upc the floor. This may appear to those of irc resolution, such as the late Duke of Wellin ton, bad advice, entirely uncalled for, ar applicable only to the supine and effeminat Our own experience, however, goes to prov that not only is such advice sometimes calle for, but essentially necessary and worthy of trial. The practice of lying too late in bed both a general, pernicious, and hurtful hab and one, by-the-bye, which, when fairly roote it is difficult to extirpate. From this evil a thousand others spring, all of them bad and productive of evil. Slumbering in bed is different form genuine sleep, eight hours being amply sufficient for the latter requirement. The late Duke of Wellington remarked to a friend, when asked how he managed to turn himself in his bed, which was so narrow, replied, "I never turn, except to turn out." It is quite evident that rising in due time, and performing certain duties deliberately in the morning, is an essential means to a young man's improvement, both mentally and physically, as much so as the winding up of a watch is to its keeping proper time, or a person taking food sufficient to sustain life. This rule ought to be strictly enforced by all possible means, and at all costs. It is not enough to rise fifteen or twenty minutes before leaving the house for work, which necessitates hurry and bustle; hence the improper doing and forgetting of things. Anything hurriedly done is always badly done. Diet is a matter of no small importance; sufficient time is also required for this. Porridge ought to be the breakfast of a young lad, or at least constitute the staple part of it. Scotia's sons may yet live to repent having forsaken this noble dish. If well boiled, of proper consistency, and sufficiently cold, it may be supped in less than ten minutes. Porridge is by far the most nutritious and wholesome food that can be taken. After breakfast, as after all other meals, a rest of at least ten minutes should be taken, and at least other ten should be employed in reading some subject worthy of reflection during the day. Another very important duty, and well befitting either young men or old, is to breathe a short prayer of gratitude to Divine Providence for the night's rest and joys of the morning. Altogether, an hour is required between the time of rising and that of leaving the house, thus entailing the importance not only of early rising but of punctuality also.

On arriving at the place of work, the duties of the day should be resumed with earnest "aident hand" and diligence, and according as the weather is, so ought the working garments to be adopted. A good working man always shows freedom in his dress, and nothing pleases him better than when get (as he terms it) "fairly strippe In well-regulated works we prefer rangement for a rest of ten minutes o'clock in the forenoon, and again ot in the afternoon. This is expressly de especially where youths are employe we would modestly suggest to those in of large companies composed of bot judiciously to consider this. The ten is locally known as "the smoking tim though all do not engage in that lux all enjoy a few minutes' rest. Man, t moving, working being, is not a mac iron or brass, alike incapable of e and unconscious of requiring rest; a rule, those who require no rest are deserve none, because they do not tired enough to require it. When the hour arrives, and after partaking of th meal, care should be taken not to li prostrate upon the back, but eithe erect or lie upon the side. In eatin are two primary rules to be observed: is not to overeat, and the other is to m well that which is eaten. A very c but hurtful practice in eating is to mouth with dry bread, and then to fill liquid to wash it down. The ultimate of this practice of eating is a stomach, which soon affects both b mind. We cannot too highly incul necessity of proper mastication of the order to maintain a healthy organiz the body, upon which all other acts, m physical, either directly or remotely de is a serious matter for a young man, ignorance of the laws which regulate hi thereby to contract diseases, such as to rheumatism, or dyspepsia, which is oft through the neglect of guardians and o trusted with youths, in withholding fro the necessary information upon whi future usefulness and happiness depe

During about three quarters of t one hour is taken at dinner time; one of it is employed in eating, and fi twenty minutes are required for assi the food; the remaining part of the hou be occupied in committing to memo tion of the subject which the young man is studying at the time. If it is Botany, he may commit to memory ten English and Latin names of plants, which, in a year of working days numbering 313, is by no means a small or unimportant vocabulary to begin with. By this means a lad will, in a short time, with due application and diligence, acquire the names of all plants he may come in contact with. Those half-hours, if well occupied, can accomplish great things, but if badly husbanded, may prove an amount and source of power for great evil. On leaving off work for the day, and on arrival at home, the first thing to do is to wash and dress before sitting down to eat. There is a strong temptation on the part of most young men to violate this rule, especially if in lodgings and sitting at table alone. In speaking of dress for a young lad, who has only from 10s. to 12s. a-week to live upon, it must be understood, in a very restricted and qualified sense, to signify generally only a change of the outer garments, including that of shoes and stockings. Who that has the smallest sense of self-respect, and can appreciate cleanliness and comfort, but would concur in the observance of these duties. Tea is now very commonly the evening meal, and is both a cheering and refreshing one. Respecting the properties of tea, however, as of most other things, there is great diversity of opinion, not only as to what constitutes the essential qualities of it, but also in respect of its virtues and the *modus operandi* necessary in infusing it. Without presuming too much, we would humbly tender a few remarks upon tea. In the first place, it ought to be regarded as a stimulant rather than as a strength-producer. There are two essential properties in tea—the one is theine, which *alone is tea* in the true and proper sense; this contains the aroma and flavour, which is extracted from the leaf by submission to hot water for about five minutes; the other ingredient is *tan*, a substance similar to that contained in oak bark employed in tanning leather. In respect to the latter ingredient, there often results considerable mischief by allowing it to be too much extracted from the leaf by protracted infusion and high temperature of the water. This process makes the tea d coloured and strong tasted. This colour a taste is regarded by some as the excelle of tea, while those better informed reject i unwholesome, knowing that it is not tea, tan, they are invited to drink.

Every apprentice should be obliged to k a diary, and to shew it to his master onc week, or at any other time when requested do so. The master examines it, and appe his initials to the part last examined, at sa time noting on the margin all errata he have discovered. The diary should be a pl ruled book, 14 inches by 9, with each f divided transversely into three divisions w red lines, one for each day. Diaries fu prepared, by dates and headings, do answer well for general use, as the necess entries for each day vary considerably, b in length and importance. One day's entr are frequently twice as long as others a hence the inconvenience of fully prepa diaries. In commencing the diary, two three folios should be reserved to form index to all the principal entries. The s jects entered in the diary daily should embra amongst others, the following subjects What description of work employed at, planting Hill of Doon; thinning Glenba draining Boggy Hill. The weather sho also be described, stating the temperatu and points of the wind at six in the morni and the same at seven in the evening; manner in which the work was perform the object in doing it, and the true probable cost. The valuable results of ke ing a diary cannot, to a young man, be o estimated. We would further state that diary referred to becomes, when filled the property of the master. This necessita the apprentice to make a duplicate of it; a in addition to the matter referred to, m other matter should be added of a stri private nature, and neither the master anyone should on any account ask to l into it; and which, if asked, should be ste refused, as such interference might tend prevent a full, true, and unreserved acco being written in future. In addition to diary, another book is highly necessary, and one which every young man should keep—viz., a note-book of correspondence.

This is simply and easily done in the following form:—

1868, Jan. 10th. No. 1. William Smith, Aberdeen; inquiry about ——
Jan. 11th. No. 2. Brother William; domestic matters.
Jan. 12th. No. 3. James Bennet, Inverness; answer about oak timber.

For this purpose a 1s. memorandum book answers well; each entry extends across the the two pages confronting each other, and should be ruled with four double lines upon the margin, on the left-hand folio. In reference to apprentices whose correspondence is chiefly social, and not yet having to do with business letters connected with the estate, this book is also private, and the master should not request a sight of it, but may with propriety occasionally ask if it is regularly and correctly posted: this is by way of reminding him of his duty regarding it.

The above may occupy half-an-hour's writing each evening, and should be completely filled up before going to bed, by no means allowing it to lie over night, though the demands of repose might urge the latter claim. One great inducement to write the diary properly and correctly is, two or more lads each keeping a similar one, posted in the same manner. Each diary ought to be compared by the master with the others, to ascertain its correctness as to dates, and other known matters of fact. Each one is thereby brought to write correctly for the sake of the other, who will detect his errors. Upon the employment of the winter evenings depends, in [illegible] the success or failure [illegible] indulging the enjoy[illegible] night to burn. If he fail, the fault is his own, with similar advantages, others have succeeded. The winter evenings may be employed as follows:—say writing diaries and other memoranda till seven o'clock; arithmetic till eight; botany, chemistry, geology, or other science till nine; geography and grammar till ten; when further advanced, drawing may occupy the place of the latter; reading history till eleven o'clock.

Of course, the above form of rules is subject to considerable modification, and must vary as progress is gained; nor is it meant that every night of the week should be rigidly occupied as above prescribed. If in the vicinity of a town or village, various societies urge their respective claims; scientific lectures should be listened to, and various other meetings, such as debating societies temperance societies, mechanics' institutes reading-rooms, &c.; all of them call for a share of time and attention. The description of lodgings must also be taken into account in determining which of the prescribed duties should be commenced with in the evening, on account of noise and bustle, &c The foregoing is an outline of the occupation of the six working days, and now one word about the Sunday, and how it ought to be spent; but before doing so, we would recommend that all sectarian principles be kept in the background. For our own part, we much prefer reading a man's creed in his principle and practice to that of hearing it verball repeated. We consider it advisable, on engaging young men, to ask no questions as to church matters; if they are in error or ignorance, better example may put them right, and i already right, so much the better. The apprentice or young man should attend som place of worship, and he should also assist in some useful Sunday work, such as Sunday school teaching. He should also atten some advanced Bible class for his own per sonal improvement. This is an excellen way of occupying time, and drawing out an developing what is within. Sabbath-school o the teaching of youth is a grand prelim ary to dealings with men in after-life. I increases patience, strengthens the spirit o forbearance, and lays the foundation of man virtues, such as self-denial. The readings fo Sundays, too, should be select, and differen from those of other days of the week, in s far as the one is for spiritual or heavenly improvement, while the other is for moral or earthly improvement. We offer no apology for these remarks, believing them to be essentially necessary as articles in a young man's calendar for life, and as a precedent to true worth and greatness. Amongst others, we have read on Sundays with interest and benefit the following books, and can, therefore, with confidence recommend their perusal to young men. First, the Bible; "Philosophy of the Plan of Salvation," by an American citizen — a standard work; Barnes' "Notes on the New Testament;" Archbishop Paley's Theology; Josephus's "History of the Jews;" Keith's "Evidences of Prophecy;" Baxter's and Bunyan's writings; also M'Cheyne's "Memoirs;" the writings of John Angel James and Dr Winslow. There are also periodicals, fresh and new, and useful in their way, such as "The Sunday Magazine," by Dr Guthrie; "The Quiver," by Cassell; "Good Words," by Dr Norman Macleod, and also Spurgeon's writings. These, and many others equally noteworthy, may be read with advantage. If these are carefully perused and duly reflected upon, the reader will be furnished with truths well calculated to store his mind with useful, substantial, and essential knowledge.

Having described some of the means whereby the moral condition of young men, as foresters, may be best promoted, we shall next advert to their social condition, and endeavour to shew how this can be best improved and advanced.

First, there must be sufficient allowance made them in the form of wages to meet all legitimate requirements, because young men at the age indicated should be able to support themselves without extraneous aid. If a lad have too low wages, he must either contract debt or remain in want of some of those necessaries of life essential to comfort and advancement. If, on the other hand, he is furnished with means more than sufficient to meet his necessities, luxuries begin to be indulged in, and extravagance, vanity, and folly soon follow. Here we would beg to tender one courteous word of advice to parents and guardians who are in charge of youths a apprentices, to let them feel in due time wl self-reliance and self-support practically me They should not lend an ear to craving l ters or encourage the spirit of mendican as by so doing they, in fact, propagate t spirit of meanness and dependence. To th as to every other rule, there are exceptio cases, such as pure accidental losses, times protracted sickness, or paying an occasio doctor's bill. Unless, however, under ve peculiar circumstances, supplementary mon should conscientiously and firmly be wi held. Habits of industry and frugality lessons worthy of purchasing dearly, and never better learned than when young, a during the years of apprenticeship.

Experience proves that the man who careless over his own, is not likely to be ca ful over his master's property, and a want carefulness may very properly be understo to mean wastefulness. Next to the means life, comfortable lodgings are of vital impo ance. In the first place, a lodger must ma up his mind to conform to the househo rules and regulations, and never for moment dream that because he pays lodgings he is entitled to do as and what pleases.

The hour for locking the door at nig should be duly respected and attended and if it be requisite to be out later th usual, leave should be obtained to do so, a on returning home he should enter his dwe ing gently and quietly, so as not to distu the inmates of the house. His actings shou be all open and manly, and never done such a way as to provoke suspicion. artifice and deception should be guard against, and leave should never be asked any account on false pretexts in order accomplish an object. With the outwa forms of domestic religion he should endeav to conform, but he if cannot conscientiou do so, it is his duty to change his lodgi for others where he can so conform. knew a young man who was in lodgings wh the household rules forbade profanity; refused to conform, left his lodgings, a went to seek them where he could swe

Another lad refused to doff his cap at table, and this also led to the change of his lodgings. Now, as the manner in which a lad conducts himself in his lodgings is a good index of what his private life is, it is the duty of the master to know well how it is spent. The most suitable lodgings generally are where the family is small, say two or three children, or where children have grown up and left the house. Another very desirable class of lodgings are those kept by a widow or elderly maiden lady. In the latter case, as many as four lads are sometimes kept; and where the woman is of sufficient command and authority, she can by this means conduct her house well, and find the means necessary to eke out her livelihood by washing, dressing, mending, &c. The above description of lodgings is an excellent substitute for bothies—meets all the requirements of the latter, while it avoids its serious disadvantages. So much has been spoken and written about bothies, that nothing seems further required to be said about them, save that where they do exist, they usually require more than ordinary skill to manage them. In bothies there is one important element awanting for social comfort which is generally present in respectable lodgings—viz., female society, without which the social scale must ever be defective and low. Briefly upon this head, comfortable lodgings, with a female attendant, proper household rules practically carried out, cleanliness, and quietude are all that can be done for the young man at this stage of his career. Having briefly noticed some of the means calculated to produce the best moral and social results, and shewn how the true comforts of life are to be secured, we may presume now to state what ought not to be regarded as comforts by young men; ut more than a passing notice of these could ot find space here.

Beginning with tobacco and snuff, these e to be eschewed, being only gratifications f the lower animal appetites; their use is a uisance, and their abuse obnoxious to others, d hurtful to some degree to those who use nem. How very unpleasant, on a balmy ummer day when the air is sweetly perfumed with the odour of flowers and foliage of th trees, on taking the pruning-knife, out o the hand of the operator to instruct him i its use, to find the blade clotted with tobacco and positively offensive with the narcoti smell, producing feelings anything but pleasant to the uncorrupted olfactory nerve. Th back of the knife, at same time, is often wor in an unsightly manner by its frequent application to the flint in lighting the pipe. Snu has also its serious and degrading objections and ought, for the same or similar reasons, t be guarded against, shunned, and avoided Let not, therefore, the young forester cal these ingredients comforts, as most master would rather detract than add such to hi stock.

Inebriating drinks are also pernicious an dangerous luxuries; and while the juice of th vine may enable the old man to eke out hi gloaming of life, or fan the flickering spar when the fire of life burns low, yet the youn man, fired with life, and already cheerfu almost to mirth and frolic, as little require artificial fire as the pot does whose content are already boiling over. Let not, therefore the young man dream of meeting with master who would help him to seek suc comforts.

Sofas and couches are also luxuries, bu safe for the young man for whom w now write, who must only indulge in them a yet in prospective fancy. An apprentice, o young man further advanced, would, we presume, blush at being seen stretched like a invalid upon a couch or sofa, and by referrin to his calendar, he will not find entry of there. There is no time allotted for luxuriou indulgence, and it is only in cases of disl cated limbs, deep cuts, or painful bruise that the sofa is ever thought of being occupied; and even then, as far as practicabl books and other studies should be turned t account.

Some young men are of gross habits of lif hence they believe that real enjoyment an special comfort consists in eating. They consequently indulge, when opportunity affords, i delicate and savoury food, and find speci delight in highly-seasoned dishes. It is well known that indulging in highly-seasoned food is gluttony, and experience goes to prove that some young men have stopped the development of their minds through over-indulgence in eating. We can lay down no abstract rule as to quality of food, and this is to be the less regretted, seeing that quality is of little importance compared with quantity. A man may know he has taken too much if he feels inclined to sleep shortly after taking food, and those who experience such lassitude should retrench their meals.

Under this head we would recommend to young lads a careful perusal of Prof. Millar's lectures upon "The Bread we Eat, the Flesh we Cook," &c.; and, for further information upon this subject, to read "Health, Life, and Disease," by Dr Johnson of London. We have been led into the foregoing subject, from a practical knowledge of the affinity which subsists between the stomach and the brain. If the former is overloaded, oppressed, or deranged, the latter very soon suffers; and these combined soon disorder the whole body, and render the man incapable of doing his duty.

There are yet other passions which, though different from those mentioned, are fraught with evil consequences to young men. The first of these we should notice is self-complacency. Let every young man guard against the unduly extolling of *self*. Nothing is more certain to prevent a master from imparting counsel and information to a young lad than that of being met with the exclamation, "I know," before the subject is fully laid before him. It is also very sickening to hear a young lad dwelling upon his own good deeds and doings—especially so, if his memory does not fully serve him, and a repetition is made of the wonderful story several times. It is well for him to bear in mind the words of the inspired penman, "Let not thine own lips praise thee." A still less pardonable practice, and one also indulged in, is that of dexterously detracting from the quality of others, so as to make themselves important, and stand brilliant in relief against the blackened characters they have soiled. Young man, engrave the lines of Shakspere upon t tablet of your memory :—

> "He that steals my purse steals trash ;
> 'Tis something, nothing ; 'twas mine, 'tis his,
> And has been slave to thousands ;
> But he that filches from me my good name
> Robs me of that which not enriches him,
> And makes me poor indeed."

Another habit of indulgence, and o which lowers a young man greatly, is th of detraction. We have often to lame young men, otherwise amiable, who cann allow others to be praised. If their mer are pointed out or favourably comment upon, and thus they elicit admiration, th to him is too much, and causes him express something calculated to dim th lustre. This, it is needless to say, if indulg in by any young man, will bring him in contempt with those of refined and cul vated minds, and hence prevent his rising the world. Open slander is also a habit indulgence which some young men give w to, but being more directly offensive th some others, it soon works its own resu by bringing the person who is its subje into low contempt. Having, as it we fortified the young man against outwa assault, and prescribed for him agair general disaster, and thus far prepared hi for entering the duties of his professi to the highest degree consistent wi his inherent natural abilities, our ne object will be to shew wherein co sists his duty, and the discharging it connexion with the practical duties forestry. He requires, in the first place, thorough knowledge of the structure and f mation of all plants he has to do wit together with a well-grounded knowledge the laws which regulate their growth. other words, he must be thoroughly conv sant with the science of botanical physiolog must know correctly all about the growth plants, and be able to explain the connexion ar relation of all their parts. Unless he kno what office the roots fulfil to the branch, ar the leaf to the roots, he is unable suf ciently to care for or assist them in fulfillir their functions in life. He must know we all about the channels or vessels which the sap traverses, the existing causes of the sap flowing, the various changes it undergoes, and the duty it fulfils in the vegetable economy. These, and various other subjects therewith connected, must be thoroughly mastered by him; and, in order to do so, books must be read upon the subject, and hours of undivided attention given to it; sleep must occasionally be lost at night, and one hour or two stolen from the morning before rest or sleep may be enjoyed. No definite rule can be laid down for study, but that which we personally prefer is to erect a theory and reason it out, *pro* and *con*, meanwhile writing the thoughts as they occur, and to leave no source unsearched whereby enlightenment may be obtained. We would recommend the perusal and study of "Jane Marcet's Conversations on Botany," which embodies De Candole's theory, which, in our humble opinion, is the best extant. But in order to form comparisons, the young lad should peruse several books upon the same subject, including Lindley's, Louden's, and Rhind's writings.

Agricultural chemistry should also be read and studied. This is necessary in order to know the soils adapted to each plant, and to know the preparations of each soil which agree and disagree with the healthy development of the plant. It is a well-known fact that while some soils sustain and nourish a plant, others will kill it. The killing properties of the soil must, therefore, be found out, and also the nourishing properties. As that which constitutes the food of one plant and kills another is a subject matter of deep study, time, patience, and perseverance must all be united in finding it out.

[illegible] is also of considerable importance [illegible] as they have [illegible] with [illegible] books [illegible] absolutely ess[illegible] [illegible] their study, [illegible] geological maps of Johnston

Without a well-grounded practical knowledge of the preceding subjects, a man may be considered only half-fledged hence must fall short of soaring to eminence or p forming the necessary duties of arboricultu

Book learning is very commendable—n essential to the qualification of a forest but this, even when complete, is only a mir part of education. Indeed, the fores whose instructions are only derived from boc is, in the true sense, no forester at all. two men, the one taught from books withc forest practice, and the other a forest-taug man without books, the latter is the m worthy, but each separately is only half wl a man is who is taught both from books a the forest. Before leaving the subject education, as considered necessary for a fi class forester, we cannot omit the gr importance of drawing, which should embra mathematical, architectural, and sketchi Land measuring is also of such vital impc ance that its daily practice necessitates thorough study.

Of all kinds of teaching enumerated, no is so important to young foresters as that ceived in the forest, and to which all oth must stand subordinate. The one is t theory, the other is the practice. The o makes a theoretical man, and the other practical one.

When the work to be performed consists manual labour, it is necessary that the ope tor be a workman. Pruning, for example, manual labour; hence the practical fores must be able not only to use but to sharp t knife, and keep it ever with a keen ed sharp the hand-saw, the spoke-shave, a pruning-chisel. He must also be able to n and apply paints, and so tone them as to s the various colours of the bark of the tre The proper branches to cut off must also known to him, the time of the year at whi they should be cut, and also the process cutting. This must be done with his o [illegible] perseveringly practised till t master is fully satisfied that he can prope do it.

The rule that applies to pruning appl equally to thinning, planting, and oth branches of manual labour; hence these m also be practised till fairly mastered. Cutti down timber may appear a simple proce but it also requires practice, and the young forester must not stand aloof till he can do it. Working with an axe requires also practice, and no forester should be without this practice. It is admitted by all good workmen that keeping the tools in proper order is of no small importance; hence every young lad should be early instructed in shafting and grinding axes. The cross-cut saw being frequently in use, he must be able to trim and sharp it, and continue in the practice till he can do so properly. Setting the teeth of saws to suit different kinds of wood requires considerable skill both of the hand and of the eye; hence practice in this is required also, to do it properly.

Being well trained and practised in grinding edge tools, sharping saws, mixing paints, &c., the next duty is to arrange them properly, orderly, and conveniently in the tool-house, which should be dry and well ventilated, not only to prevent rust, but to preserve other articles, especially ropes, as decaying ropes are worse than useless, and a few days lying in a damp place will render them worthless.

As a simple test of qualification in young foresters, we have much more faith in what may be seen in a tool-house which they keep, than in what they can shew upon a sheet of writing paper. Indeed, this is becoming more and more a test of qualifications, seeing that what a man does and what he has done is much more reliable than that of other tests. Practice in the saw-mill is of too vast importanc to be overlooked, and the young foreste should acquire experience in the variou operations connected with its managemen and employment.

A visit or two to the ship-building and boat building yard, minute inspection of all th timbers in use, where and how they are placed and a correct statement made of what he see there, is a lesson which every young man should avail himself of. Travelling is also o great importance to young lads, by way o increasing their general knowledge and expanding their views; hence all due encouragement should be given them to accomplish this on all fit and proper occasions.

Few things are of greater importance t young foresters than a knowledge of *horses*— not so much as respects their points of meri so as to be able to sell or buy, but should embrace everything connected with grooming feeding, and loading; and in order to attain this knowledge it is imperative that every young lad should be induced to discharge the ordinary duties of groom, carter, and coachman. As foresters invariably have to do with horses, it is thus necessary that they should be practically acquainted with them and everything belonging to their harness, &c

Having already far exceeded the contemplated scope of this paper, and yet embraced only a comparatively few things, we must with reluctance, say to the young forester good-bye.

The Stable.

ROUGH LEAVES FROM THE NOTE-BOOK OF A VETERINAR SURGEON.

THE following remarks are not irrelevant to the subject discussed in our last Number, and may be considered as supplementary to it.

I have often thought that there was a great affinity between pure pneumonia, and what we term inflammatory fever, *i.e.*, black-leg, &c.; but I never met with the latter in milk cows—always in feeding cattle, or young heifers rearing, but the former very often, and generally the animals were in but middling condition. However, considering the great importance of the subject, it may not be amiss again in this place to call the attention of the farmer to inflammatory fever, or what I here venture to call congestive pneumonia, or a congested state of the blood vessels of the lungs, and of the vascular system at large. Strictly speaking, it is not a direct disease of the lungs, being but secondary, or resulting from derangement of the digestive organs, and especially, if not principally, of the maniplies or third stomach, caused by too rapid or rich feeding; at the same time, it is only when the congestion attacks the lungs that attention is called to the disease. No doubt, had it been observed, the fæces would have been seen some days previous to be getting hardish, black, and fœtid, the animal not feeding or rather grazing so kindly—I mean the appetite not so good—and a slight heaving at the flanks, breathing quicker. Now, from that, one would naturally expect [illegible] fever to be lying dormant in the system [illegible] change of the weather suddenly takes place, inflammation breaks out, and the lungs are the first to shew. It would exceed any limits to enter fully into the physiology of how that is brought about; suffice it, that the lungs should be quickly relieved of the carbonized black thick blood, and the vascular [illegible] large, or in plain words, bleeding should be done till the animal breathes freel at the first bleeding; when syncope seem approaching, or the animal like to drop, sto for a little, and in the interval give the physi If necessary, bleed again and agai until the blood appears of a more brigh scarlet colour, or becomes oxygenized, fro the air being now able more freely to circ late through the small bronchia or air cell in the lungs. When you have accomplishe that result, you may generally say your anim is safe; at the same time, you have anothe great impediment in the maniplies, but if yo accomplish the first you have plenty of tim to try the other, following up the physic aft the first dose by giving half or quarter dose as the case may require, every six or eig hours, until the bowels are well opene It is from congestion of the lungs that t animal dies so rapidly. When this is remedie the whole vascular system is considerably r lieved, and the disease settles more or less one leg or quarter, which is known, as befo stated, by a crackling, rattling sound, or as there was air between the skin and flesh. some cases, it follows that ulcerous sores short after break out on the limb—but this great depends on the early and effective bleeding Wash them well with chloride of lime dissolv in water; then applying tincture of myrrh a aloes, keep the bowels well open by an occ sional dose of salts, and to keep fever do give the usual sedative draught, omitting t belladona. As a preventive in cattle which a thriving too rapidly, or in changing them fro poor pasture to more luxuriant, bleed a physic, and peg or insert setons each side of t dewlap. Calves, after being first turned o in the course of three weeks have them t and do the same. I need hardly mention t necessity of having pieces of salt placed h and there in the field.

HAS THE ENGLISH BLOOD HORSE LOST CHARACTER FO POWER AND ENDURANCE? AND IF SO, WHY?

By Joseph Gamgee, Sen.

In writing the following paragraphs, I have in aim the establishment of knowledge, firstly, of some facts; then causes; and lastly, consequences.

I have read most of the contributions lately published in the London newspapers more or less bearing on these questions, including the letter in the *Times* of 25th May, by Sir Joseph Hawley, Bart., and Mr Chaplin, M.P.; and I shall, as far as is compatible with my subject, avoid going into details which have either been sufficiently dealt with, or do not tend to elucidate my views. But, like other writers, I must draw some of my data from published records and reliable traditions.

Most unbiased readers will have become persuaded by this time, after the discussions carried on, and which are only repetitions of those periodical returns to the consideration of the matter which come by paroxysms, and then flag for a time, and which, if they prove nothing else, indicate that something concerning it is radically wrong; but after all, it is encouraging to see noblemen and gentlemen going into the inquiry for themselves, in a manner in some measure befitting so great a question as that of the preservation of the high standard of excellence of English horses. In addition to what has been said on the relative stoutness of race horses of past and those of the present time, as a first point of comparison, I may submit the following:—In 1723, August 10th, nineteen five-year old mares started for the King's Plate at Hambleton, carrying 10 stone each, 4 miles; and after giving their names, our authorities, Messrs Weatherby, state that "they all came in as here placed."

Supposing that as many mares as horses were at that time in training—not likely—we have the representation of at the least thirty-eight animals of five years old on the turf, of King's Plate form, in one part of the kingdom, and the greater number of them, no doubt, of the count in which these nineteen were so distinguishe After the lapse of one hundred and forty-s years, can we rival that exhibition? It forn no part of my present purpose to make r marks on the comparative speed of the ra horses of old, and those of the present or i termediate times. But whatever the diff rence might have been between those of th early and latter part of the century, there w no falling off in stoutness, for instanc Eclipse and Highflyer, foaled respectively i the seventh and eighth decades, both retire from the turf sound and victorious, neither them ever having been beaten, as hand capping had not been adopted for levellir down. I believe that the fashion general, when men speak of these or oth renowned horses of remote periods, to rega them as isolated specimens of their speci and class, appearing at long interval whereas the right way to view them is representatives of the best of the age; ar that there were such hygienic regulations ar skilful management on the whole as succes fully preserved horses unimpaired in spe and power, so that the best appeared as suc and held their places. Basing the succee ing part of this paper on the hypothesis th horses do not stand work now as they did the periods referred to, I shall endeavour shew when the change first began to occ and the cause, and sequence of causes.

The main question awaiting consideratio I submit, is one of health—soundness horses, again to be reduced to one of soun ness of feet and limbs, since I believe th diseases of horses which sap the constituti have been less common and destructive our own time than formerly.

The beginning of the confusion was in t year 1794, when, unfortunately, the Lond

Veterinary College, which had only been inaugurated a year, lost by death its first and only Professor, and when in that emergency a successor was chosen. Often as these incidents have been referred to, the importance and enormity of what happened has never been realized by the public, or the veterinary profession as a body. It would require a consideration of the history of farriery and that of veterinary schools to do justice to the questions I am dealing with.

The requirement of the time was a staff of able teachers of the art of farriery, to form a foundation of all that had been handed down by posterity, and adding thereto all that the sciences could, by assiduous labours and learning, contribute. Preliminary to a staff, the most fitting person was to have been elected; but here a fatal mishap occurred. Instead of a veterinarian or a practical farrier, the choice fell on a young medical gentleman of twenty-four years of age, who, after serving an apprenticeship to a surgeon and apothecary, and walking the London hospitals, as was the custom, and was about to begin practice in his line, was chosen to be the philosopher and guide in a new sphere, and that altogether strange to him. Readers now can with difficulty realize either the magnitude of the blunder, or the extent to which the nation's interests and welfare were committed. Our once revered master, Mr Coleman, if he had really determined at this early age to change his profession, should have devoted due time and labour to acquire knowledge of the new art before beginning to practise, much less to teach it. In succumbing to the temptation of apparent honour and positive gain, a step was taken which, if pardonable, was the reverse of commendable. From that hour the old practical landmarks of farriery —shoeing and managing horses' feet—were assailed, which, defective though they were, were all we had, and had rather improved than otherwise in the course of the closing century.

Sir Joseph Hawley and Mr Chaplin give us the result of their experience of the capability of horses to train on in 1843, and statistics to mark the decline: and I find no inconsistency in thus taking a period, but th contrary, from its being the narrative things seen and understood. But ho are readers to reconcile the effects, on pointed out as occurring in those recent yea with causes which I allege to have the foundation at a period forty-nine years pri to the institution of these observations? Th parable which tells us that those who "so wind shall reap the whirlwind," will help here.

I would suggest that to nothing does th passage quoted apply so pointedly to education, in its remote effects. (three conditions in education, prop and efficient teaching, apathy and id neglect, and erroneous teaching, th last is incomparably the worst of all. M Coleman's inventions, or principles, or system as the whole was sometimes called, had n limit as regards the application to horses' fee It interfered with all the manual details shoeing; but worse still was the false repr sentation of the component structures of th horse's limb and foot, and the absurd inte pretations of design and functions. This, the long run, not only set shoeing smith wrong, but it set everybody engaged in th preservation and management of hors wrong; and besides spoiling the farrier supplanting the masters, and degrading th men, every stable-boy became imbued wi absurd notions about horses' feet, and caus of lameness, which, according to appearanc present, are represented by unintelligib phraseology.

The effects of the change, though such to cause notice and opposition, and which uncompromising hands took rapid and dee root, did not directly extend to the hors of the turf. Toward the end of the centu great men saw the importance of improvin the state of veterinary medicine; but onc a place called a College had been founde under the auspices of their names, with th of the King at the head, the barque was left the mercy of the man at the helm.

Protests and exposure were made by Mess Moorcroft in a pamphlet in 1802, Brac Clark in 1809, Joseph Goodwin, vete nary surgeon to the king, in 1820, and by Delabere Blain throughout the whole period; but all these had no other effect than that of diffusing the destructive system. The motives were regarded as jealousy of a martyr to science, whose aggregate annual income, from plurality of offices, was said to have been about £4000 annually; and I regret to say that I shared for a time that pathetic sentiment. Effects of the altered practice on horses were, to my own knowledge, most and earliest marked near to the source—London; and in the cavalry regiments (for the author was appointed principal veterinary surgeon to the army), colonels were invited to send farriers from their regiments to learn the new plan of shoeing at the College. In my own experience, bred out of harm's way as regarded the early impetus of the new plan, and obtaining the common opportunities afforded in an Essex agricultural district, I had become enamoured with the art of farriery before I heard of more than I saw of it. But as the war had terminated in 1815, soon thereafter the talk of new plans, and new discoveries on shoeing, and of diseases and remedies, came to my knowledge, and stirred the desire for more. At length, when nineteen years of age—1820—I paid my first visit to the place I afterwards called my Alma Mater, where, seeing horses unnerved, and some with their hoofs pared to the quick, and into whose soles a deep gash had been cut, and half a pailful of blood abstracted; all of which filled me with enthusiasm to enter the institution and learn the why and becaus which desire was carried into effect three yea later. Guided by subsequent experience, believe that race horses had been but litt subjected to the new order of things up the time to which I am referring, and th Eleanor, Tramp, and Blacklock were much under the old school management the horses alluded to of the last centu were. But the mind of the country w impregnated; old hands were dying off, ar a new generation of men were taking the place. And this brings us imperceptib down to the time when early trainin got more into vogue, and the Lam lighters over four miles became scarc Bad systems multiply risks, and the upset men's calculations, and destro confidence. And when, by repetitio of failures, it was found that young rac horses were very subject to lameness, an that they went off—lost speed before lamene was even perceptible, the inevitable alternati suggested itself of running the horses earl and frequently while they had it in them And so on, by turn, these effects become ne causes.

The question is not one limited in its rel tions to race-horses. It belongs to all, an affects the interest of breeders and owners all horses, which are neither developed no preserved as they used to be in Englan With talk, and nothing but talk, the evil ha been seventy-four years spreading, so it ma extend to the end of the century, when ou great-grandchildren will have to deal with it

The Dairy and Poultry-Yard.

DUCKS AS PROFITABLE POULTRY.

IF farmers or others are situated so as to be able to give ducks proper attention, even our common mongrel varieties may be made the source of great profit. Next to the pigs, there are no animals on the farm which will dispose more rapidly of a quantity of food, or shew by rapid growth that it is better digested. In fact, we presume that, were weights carefully taken, it might be shewn that ducks would convert a given quantity of grain and grass into meat in a shorter time than even pigs, and very likely they would beat the swine, both in time and quantity of meat. In selecting varieties for profit in eggs and flesh, *two* breeds present themselves which are decidedly superior to all others, and between which there is little choice. These are the Rouen and the Aylesbury. Both are of the largest size, and both good layers, setters, and mothers, though the Aylesbury is claimed to be less awkward and clumsy. This claim, we think, is founded more upon the fact that it ordinarily weighs a little less than upon any positive graces. There is a well-founded claim also in favour of the Aylesburys, that they are earlier and longer layers. This is disputed by some of the champions of the Rouens, and there is probably really much less difference betwee the choice specimens of the two breeds tha between different birds in the same duck-yar

Ducks begin to lay in winter or spring, soon as the weather moderates, and, if we fed and housed, they rarely fail to lay an e a day, until near the end of their season, f two or three months, or even longer. Du eggs must be carefully handled, or they w not hatch; and though ducks are careful a good setters, they are not so easily manag as mothers as are hens; hence it is usual best to set the eggs under hens. The you should be kept in a close, dry pen, with dish of water not large enough for them wet themselves in at first, for which a tub trough is afterwards substituted. They e any coarse meal well up; crushed oats a barley are excellent. They need some gre food, and are benefited by fresh meat small quantities. As soon as they are fledge the hen may be removed, and the duc given their liberty; when in marshes ponds, they will pick up nearly as much fo as they need, unless they are forced for ea marketing. They bring about the same pri as chickens, and are usually fit for mark much earlier.

[illegible] FOWLS—CAUTION.

N[illegible] see an article going the rounds of the papers recomending bone dust as food for fowls. [illegible]uld seem that a correspondent of the *Germantown Telegraph* accidentally allowed his hens to have access to some bone meal, and, presto! his hens began to lay almost continuously. The subject was immediately taken up by the agricultural editors of our weekly papers, and heralded as a wonderful discovery.

Now, if we could always be sure of the characte our bone dust, this practice would be most excellent, unfortunately, bone dust is made from bones in ev tage of putrescence; and although this does not af t for manurial purposes, it does affect it for the feed of animals. Bone dust is no new article as a food fowls. Twenty years ago a friend of ours, who pri herself upon the excellence of her black Spanish fo and who was anxious to stimulate their egg-laying powers (as the eggs brought a high price), was recommended to use bone dust for this purpose. She did so, and lost several of her best fowls—lost, it was supposed, by the action of that putrescent poison which is sometimes found in decaying animal matter.

If a really good article of bone dust, freshly made from fresh bones, can be had, there is no better adjunct to the food of fowls; but if we wish to avoid all risk, the best plan is to procure fresh bones and chop them up with an axe or hatchet. Our chopping-box is made thus: We took a piece of oak plank 12 inches square and 2½ inches thick. This formed the bottom of a box just 7 inches deep, the sides being made of 1½-inch pine. One side, however, is but 3½ inches high, so that when the edge of our hatchet lies on the plank bottom, the handle passes over the side of the box without touching it. Soft bones can be had at any butcher's shop. The hard and large bones are too difficult to break. Ribs, &c., placed in this box, can be easily and quickly chopped up into pieces the size of a bean. A boy will chop up 10 lb. in very short time, and this will last two dozen fowls f a week—nearly 1 ounce per day to each. On larger scale, a machine might be made which woul readily crush the hardest bones. We find that bon broken into pieces which will pass in any directic through a hole ⅜ of an inch in diameter, are sma enough. The gizzard of the fowl soon grinds the up, and they partially serve instead of gravel.

There is no more valuable adjunct to the food fowls than cracked bones. Our readers must not fe disappointed, however, if their hens should not l immediately after being fed with bones. It frequent happens that about the time their hens would begin lay of themselves, the owner makes some change their diet, and immediately attributes their laying the new article of food. We have seen bones, buc wheat, peas, beans, pepper, meat, &c., all tried witho effect, and then again we have seen hens sudden commence to lay freely without any special stimulan The lesson to be learned from this is obvious.

SETTING BRAHMA-POOTRA FOWLS.

MY plan of setting is to have a room not accessible by the laying hens. In this room I arrange a row of boxes 12 inches high and 11 inches square, in which I form a nest by first placing paper over the bottom and put sifted coal ashes on the paper, giving the dishing form, and about 1 inch thick; on the ashes I put about an inch thick of straw or hay—on this place the eggs. At twilight in the evening I take the hens desirous to sit, and handling them gently place them on the nests; by morning if they remain on they will stick; and those I have set so far have done their duty. I set not less than two, or all I wish, at one time when I can, so that in hatching I may place at least 15 to 20 chicks under one hen; the other hens I shut up in a coop for a week, by which time they will forget to cluck, and soon commence laying. I find the Brahma a superior mother, and in no instance have they broken the eggs while sitting. I allow the chicks to remain 24 to 36 hours under the hen after hatching, and they hatch in 21 days from the time of setting. I always feed the young chicks with corn meal mixed with boiling water, stirring in a little salt sufficient to taste it slightly, and mine have not been sick or troubled with pip; last year, I lo none until six weeks old, when 1 out of 103 died disease. My coops for hen and chicks are 20 by inches, tight all round but the front, which is op and covered with lath close enough to keep i the hen. The coops are stationary — twel in one row — standing on the ground wi 4 inches of coal ashes for the floor, facing the sout east, and enclosed by a yard 18 by 20 feet square, a pickets 7 feet high to keep off cats and vermin, a placed ¼ inch apart to keep out rats, with a ba board 12 inches wide, 6 inches of which is in t ground. The ground is dry, and so arranged that rainy weather the water runs off freely. When nece sary, the flooring of ashes is renewed. Wood ash are equally good. My setting-room and laying a roosting rooms are covered with wood and coal ash 6 inches deep, which I remove to the garden wh necessary, and replace with fresh ashes. Connecte with the setting-room is a small yard, into which t setters can go to stretch and dust themselves. find the Brahma chicks very hardy.—*Albany Cul vator.*

BRAN AS FOOD FOR FOWLS.

WHEAT bran contains a large amount of nutritious matter, and those who have simply examined the analysis of good samples of bran have praised it highly as an article of food for most animals. It contains 14 per cent. of flesh-forming material; nearly 4 per cent. of fat or oil, and over 5 per cent. of mineral matter. In all these it is richer than the pure wheat itself. But, unfortunately, bran forms a striking example of the fact that the mere analysis of the chemist, unaccompanied with any explanations, cannot give us a correct knowledge of the nutritive value of a given article of food. All the essential nutritive matters are present in bran, but unfortunately they are so locked up that to most animals they are of little avail. The dog derives but little nutriment from bran. Fed on wheat bran, first washed to remove the flour and then cooked, he falls away rapidly in flesh, and the bran passes through him almost unaltered. The cow, if fed on warm slop made of bran, increases in her flow of milk and thrives better. But here the benefit derived is largely due to the warm drink and the flour which adheres to all bran. The bran its can be washed out of her excrements almost unaltere The same is true of the pig. Careful examination h fully convinced us of these facts.

But there is one animal that seems to have the pow of utilizing even bran. That is the chicken. I powerful digestive organs reduce it to a form in whi it is no longer recognizable, and we have every reas for believing that during this process much of t nutritious matter present is appropriated. In pr paring bran as food for fowls, the best plan is to mal it into a stiff mash or porridge, as otherwise the fow cannot readily pick it up. And for the purpose making it more tenacious we generally add a little co or buckwheat meal, and boil the whole thorough together. So prepared, the bran can be fed witho material waste.

When so fed, the birds require abundance of go sharp gravel. But we feel perfectly confident in sa ing, from our own experience, that it will pay well cook bran and barley meal as a food for fowls.

DO FOWLS NEED LIME IN THE MINERAL FORM?

"RURALIST," in the *Albany Cultivator*, makes the following valuable remarks on the above subject. After referring to the almost universal belief that fowls require to eat lime, &c., for the purpose of supplying shells for their eggs, he goes on to say:—

"We have often asked people experienced in raising poultry and eggs, and farmers and men of observation and good judgment, for what purpose fowls consumed these things; and hundreds of answers, year after year, have almost always, without an exception, been given instantly from the tongue's end, 'Why, of course, to furnish lime to form the egg-shell; every one knows that.'

"We have made this subject a matter of observation and reflection for many years, and we think the belief is utterly erroneous, and cannot account for its extensive prevalence in any other way than by assuming that people generally have paid very little attention to the matter."

The most correct published views on this subject that we have seen, are briefly but forcibly uttered in an essay by James [illegible] Gregory, published in *Agriculture of Massachusetts*, of 1859. After opposing the n tion by arguments from analogy, he says:—"It is tr fowls will eat fragments of bone, clam shells, and ston and it is therefore inferred that the lime must be use in the formation of the shell of the egg. But the mal eats this mineral matter as readily, in proportion t the amount of food consumed, as the female. Agai in the pebbles there may not be a particle of lim and yet they will devour these, and for the sam reason that the fragments of shell are consumed, viz to supply that wonderful internal grinding apparat of theirs with mill-stones; and as nature is no bungl in all her works, she has made them good millers b implanting in them a liking for the hardest and mo angular fragments. Finally, it is against all th analogy of nature to assume that an animal, with i functions in a normal condition, requires any miner as food which has not first passed through the wonde ful laboratory of animal or vegetable life. Corre observation would have brought numerous instanc to light in which fowls have readily produced th daily egg to order, properly cased in pure crystalli white, without access to any lime whatever the who winter through; experiment would have taught that the natural appetite is satisfied when the minerals fed to them are of convenient size, hard, and angular, *let the composition* of them be what it may."

Almost every living thing, from man down through beasts and birds and the fishes of the sea, has a framework of bone, composed mainly of lime, which is constantly changing and being renewed while life lasts. But all this renewal comes from the food, and not from a supply of lime in the mineral state. In the bones of man and of quadrupeds, &c., the phosphate of lime largely prevails, while in the shell of an egg the carbonate of lime composes the main part, and nearly 90 per cent. of the whole earthy substance. Nature works by analogies, wonderfully similar, down through all her living creations, and we do not believe that, in the case of fowls and birds, she would step aside from this general law, and require them to procure the material for the shell of their eggs from lime in some mineral form.

MANAGEMENT OF HEN AND CHICKENS.

THE chicks should not be taken from the nest as soon as hatched, but should not be disturbed for six or eight hours. When they are taken out, put them in a dry, comfortable coop with their mother, and feed three or four times a day—for the first three weeks on meal; after that, one meal a day of good wheat or cracked corn, besides the meal. Some say that the raw meal and water will kill the chicks, but ever since I have been keeping poultry I have fed the raw meal, and during the past season I only had two chickens die of gapes, and a very few by accident. If you are so situated that you cannot let the hen out of the coop, without her doing mischief, the chicks will in a week or two run about and scratch and pick as well as their mother could for them. I have frequently seen chicks scarcely two weeks old ranging off from the coop, nearly a quarter of a mile. Still the mother, if you would keep her healthy, must be let out at least once a week, to obtain grass, gravel and exercise.

When the chicks are two months and a-half or three months old, they can be weaned and turned into the chicken house with the old fowls, and a new family put into the coop. In summer the best way to manage is to set say six hens at once and give all the chicks to two hens, as in warm weather, after the first week, chicks do not need much covering. In the hot, scorching days of summer, chicks should never be without water, as the little creatures suffer a great dea unless a plentiful supply is given them. But hens should not be set in the very hot weather of summer, for the hens themselves not only suffer a great deal, but the chicks when hatched are sometimes nearly dried up by the sun. Begin setting hens in March and not after June; then some could be set in the latter part of September. Some persons have conveniences to hatch chickens all the year through, the hottest weather of summer and the coldest of winter.—*Lewis Hooff, Jun., Fairfax.*

FEEDING COWS AT MILKING TIME.

IT is the habit of many persons, especially if they keep but one or two cows, to take, morning and night, into the barn a pailful of moist feed at the same time thay do the empty milk pail. Others bring a basket of ears of corn from the crib, while a still greater number pitch down and lay before the cow a forkful of hay preparatory to milking. The object in all these cases is the same: to give the cow something that will keep her in good humour while she is being milked. This foddering is the basis of a compromise, in which it is agreed that the cow shall keep her legs and tail still while she is being milked, but shall be at entire liberty to exercise with her nose as much as she pleases. It is a bargain in which the milkers agree to give the cow a pail of warm food, or its equivalent in exchange for a pail of warm milk. You agree to give up to her a certain amount of food that rightfull should go into the hog-trough or the horse's feed-box provided she will give down an extra quantity of he coveted secretion.

Now we will not consider this practice in a mora point of view, nor hint that such bargains and compromises are ordinarily coupled with "fraud and corruption;" but we suggest that this habit of feeding cows while they are being milked, is a bad one in man respects. Giving cows an extra feeding at milkin time, in order to induce them to submit quietly to the operation, is very much like bribing children with an extra cake or a stick of sugar-candy to go to bed without crying. Discontinue the practice for a single time, and you will see the result; the cow that was coaxed into gentleness, is now restless, cross, and inclined to hold her milk and kick up her heels. The truth is, she is not going to be milked in quietness unless she is paid for it. Let a cow contract the habit of being fed at milking time, and it will be found about as hard to break off as is the habit of using tobacco by her owner. She will expect this extra allowance as much during the month of June as in the month of February.

But this is by no means the only trouble that results from this practice. Cows will not unfrequently—at least this is our experience—get into the habit of cramming down their food, on such occasions, with the utmost greediness, so as to leave the feed pail empty some minutes before the milk pail is full. This they do, thinking to have it replenished as soon as the bottom is reached, of which event they wil admonish you by a lusty kick; indeed, we have cows that had considerable experience in th ter, that learned to give down their milk inverse ratio to the rapidity with which they de their provender. They did not seem to ha ability to do two things at once; and so they d all their energies towards emptying the pail tl before them, and giving no possible heed to t that was out of sight.

Cows are not famous for their sagacity as are but it is certain that they will learn to take the tage of the milker in getting an increase o allowance of food at milking time, and tha will contract habits that will give the milkeı trouble.

A cow that has been accustomed to be fed at ı time during early life, will be milked with di ever afterwards, if denied her usual rations; heı importance of keeping them from acquiring th while young.

The Country Gentlewoman.

ON THE PRODUCTION OF COLD, PARTICULARLY OF COOLING LIQUIDS.

THE cooling of liquors in domestic economy has at all times been a practice of general prevalence in warm countries, and during the heat of summer even in colder climates. When the temperature of the air is above 70 degs., cooled liquors become not merely a luxury, but are considered in some countries as an article of the first necessity. The languor which is induced by heat is in a great measure relieved by artificial cooling; and invalids, in many cases, receive great benefit from the use of cooled liquors.

The custom of preserving snow during the summer for this purpose has prevailed among oriental nations from the earliest ages. In the Book of Proverbs we read, "as the cold of snow in the time of harvest, so is a faithful messenger to those who send him; for he refreshes the soul of his masters:" and we learn from various passages in the writings of antient authors, that the Greeks and Romans were long familiar with this luxury. In the time of Seneca, snow collected from the mountains and preserved in deep pits had become an important article of merchandise in Rome, was sold in the shops, and even hawked about the streets.

The following passage from Mr Lumisden's "Remarks on the Antiquities of Rome," describes the present method of managing this matter. "A little above Rocca di Pappa (on the antient Mons Albanus) is a plain called Hannibal's Camp. It is here that the snow is collected annually for the use of Rome. On this dry plain they dig pits, without any buildings, about 50 feet deep, and 25 broad at top, in the form of a sugar-loaf or cone. The larger the pit, the snow, no doubt, will preserve the better. About 3 feet from the bottom they commonly fix a wooden grate, which serves for a drain, if any of the snow should happen to melt, which otherwise would stagnate, and hasten the dissolution of the rest. The pit thus formed, and lined with straw and prunings of trees, is filled with snow, which is beat down as hard as possible, till it becomes a solid body. I is afterwards covered with more prunings o trees, and a roof raised in form of a low cone well thatched over with straw. A door i left at the side, covered likewise with straw by which men enter and cut out the ice, fo such it becomes, with a mattock. The quantity daily demanded is carried to Rome in the night-time in carts well covered with straw. It is found by experience that snow thus pressed down is not only colder, bu preserves longer, than cakes of ice taken from ponds or ditches.

The use of snow to cool liquors at th tables of the great does not appear to hav been common in any country besides Ital and the neighbouring states, before the end o the sixteenth century. At that time ther were no ice-cellars in France. But toward the end of that century, under the reign o Henry III., this refinement was well known at the French court; and although at first i was considered as a mark of excessive and effeminate luxury, it soon became general i France, and towards the end of the seventeenth century dealers found the sale of snow and ice a profitable trade.

The method of improving the cooling powe of snow by mixing it with various salts is modern invention. The Italians were th first by whom it was employed. Abou the year 1550, all the water as well as win drunk by the wealthy in Rome was cooled by a mixture of snow and saltpetre, and afterwards common sålt was substituted for the latter. Lord Bacon, who died in 1626, was acquainted with the cooling properties of snow with saltpetre or with common salt, so as to freeze water, but says that he had never tried the experiment. Soon after this time the French made the discovery in the art of cookery of congealing by cold a variety of agreeable juices, and of forming ice-creams and other luxuries of that class.

The most antient method of using snow or ice was by putting a small quantity of it into the liquor to be drunk; but afterwards a more elegant method was employed by putting the beverage into a vessel of thin glass or metal, and surrounding this with the snow.

In the south of Italy and Sicily at present iced water is become an article of prime necessity, and is sought for at all seasons, both in summer and winter, with an avidity which, to a native of a northern clime, appears at first view quite unaccountable. Snow for this purpose is preserved in several caverns in Etna, and is brought down from the mountain to be sold in the shops, which are often surrounded by a clamorous mob of purchasers, who express an eagerness to procure it that naturally excites the astonishment of an Englishman. Ice is now transported in ships from cold to tropical countries; and a cargo of it carried to India or South America is not uncommon.

Various methods have been employed for the production of artificial cold. The methods at present in use may be reduced to three:—1. The application of some body naturally colder than that to be cooled; 2. By evaporation; 3. By the solution of certain saline substances. Sometimes two or more of these methods are combined to increase the effect.

For the first method the use of ice and [illegible] the most generally practised; and for this purpose they are preserved in ice-houses, or other proper places for cooling liquors in the summer, or during the whole year. A little ice, placed round a bottle of water or wine, in any convenient vessel (wood is the best material, [illegible] being the worst conductor), soon cools it to the desired degree; and the effect is to be increased, so as to freez cream, fruit, &c., by breaking the ice int small pieces, or pounding it, and mixing common salt with it, the desired end will be accomplished. This method is employed by th confectioners. The principle upon which ic cools any liquor is, that it abstracts heat fro every body surrounding it, till the temperature of the whole is equalised; and, of course it melts itself in cooling other bodies, the hea which it takes from them being necessary t render it fluid; this heat becomes latent i the melted ice.

When ice is used to cool wine, it will n be very effectual, if applied, as is sometime the case, only to the bottom of the bottle for the coldest part of the liquid, being alread at the bottom, cannot ascend; nor can th upper part, which is the warmest, chang places to be cooled; therefore, no motion ca happen in the wine, and the cooling wil therefore, be very imperfect. To cool the win effectually, it is necessary to plunge the whol bottle in ice; but before this is done, it i proper to decant it into a fresh bottle for th following reason:—If there be any sedimen in the wine that is of the same specific gravity, it will mix with it as if it had bee shaken, from the up and down currents tha always take place during the cooling.

When ice cannot be procured, well-wate forms a useful substitute to a certain degre A well of about forty or fifty feet in dept constantly preserves the mean temperature o the country, and consequently is colder tha the summer heat o the place; hence, if pail of water be drawn, and a bottle of win or other liquor be immediately placed in i it may be cooled considerably. In Londo where the heat of summer may be above 6 deg., or even 70 deg., the temperature o well-water will always be 50 deg.; therefore, by this alone, liquors may be sometime cooled 12 deg. or 15 deg.

One of the most general and useful mode of cooling is by evaporation. When any liqui is converted into vapour, a certain quantity o heat to be combined with it is necessary f this purpose, and the portion which rises i vapour abstracts caloric from the mass, which is consequently in proportion cooled. Any substance which is wetted with water, and kept in the air, will, therefore, be cooled by the evaporation of the water, and the more rapidly if it is held in the wind, because then the evaporation will be greater by the succession of particles of air each carrying off so much heat. Take two thermometers, and wet the bulb of one, and not the other; hold them in the air, and the mercury in that only which is wetted will fall, through the cold produced, as the bulb dries. If a liquid be used that evaporates more quickly than water, as spirit of wine, and, still more, ether, the cold produced will be more considerable.

Cooling by the wind is a method that can be employed only occasionally. If any part of the naked body, as the hand, be exposed to the wind, it will be cooled, because there is an evaporation from the surface. A practice among sailors for telling which way a very gentle breeze blows in the night, is founded upon this fact. They wet a finger all over, and hold it above their head; the side that is most cooled is that which the wind blows upon, and of course points to the quarter from whence it comes. Should, however, the current of wind be warmer than the body it blows against, the latter will be heated, as is the case with the hot winds from sandy deserts.

As an example of the various degrees of cold occasioned by the evaporation of different substances, we may cite the result of some experiments made by M. Cavallo, and described in the *Philosophical Transactions.*

"A small stream of several liquids was poured upon the bulb of a mercurial thermometer when the temperature of the atmosphere, and consequently of the thermometer, was at 64 deg. Water lowered the thermometer to 56 deg.; spirit of wine to 48 deg.; spirit of turpentine to 61 deg.; olive, and other oils that do not evaporate, did not affect the thermometer; ether reduced the thermometer to 20 deg. below the freezing point; and with a small bulb, it required only twenty drops of ether to produce this effect in ten minutes. If a small thin glass tube be filled with water, and wetted with eth the water will be converted into ice in minute or two, from the rapid evaporation the ether."

The practice of cooling on this princip has been known from time immemorial. is a common thing in the southern parts Europe to wrap up a bottle of wine, wat or other liquor required to be cooled, in wet cloth, and thus to suspend it in a sha place, either under a tree or in a passage, as to expose it to the briskest current of that can be obtained; by this means t liquor will be cooled several degrees; ca must be taken to sprinkle more water up the cloth which surrounds the bottle in pr portion as the former evaporates. In Ind it is the general custom, in order to keep t wine cool, to clothe the bottles in wett cloths fancifully ornamented with flower and to cause them to make the circuit of t table in this grotesque dress, instead pouring the wine into decanters. Po claret, and Burgundy are characteristical attired in crimson with white flowers; whi Sherry and Madeira appear in bridal c tumes. It is upon this principle—namel the cold produced by evaporation—th persons sustain much injury by sitting in w clothes.

Vessels called *alcarrazas* are much e ployed in Spain for cooling water, and the is scarcely a house in that country whe they are not in constant use. What disti guishes them from other kinds of earthenwa is their porosity, which is so considerabl that being filled with water the liquid ooz slowly through, and stands in minute drop like dew, on the outside; this evaporat and produces cold, particularly when the a is warm, or when there is some wind. Th loss of heat from the outside is supplied fro the water within the vessel, and the continue evaporation produces more and more cold and the agreeable coolness thus given t water in a warm climate is extremely grat ful.

These vessels appear to have bee introduced into Spain by the Saracens, an their use has since been extended to all th

Spanish colonies in America and India. Vessels of a similar kind have, however, been known from time immemorial in China, Hindostan, Persia, Arabia, Egypt, and Syria.

The most celebrated manufactory of this kind in Spain is at Anduxar in Andalusia, the best earth for the purpose being found on the banks of the river Tamusoro. After being well tempered, it is mixed with a little salt, and the heat in baking is not so great as to render the salt insoluble in water; the salt being dissolved it produces the necessary porosity in the vessels.

In the neighbourhood of the convents of Vittoria near Malaga the country people find a useful clay, of which they make the large red jars called *beccaras*, used for cooling water, though inferior to the alcarrazas. Without these contrivances the inhabitants of these sultry shores would be deprived of one of their most essential luxuries.

The dryness of the air in these climates, and particularly in Italy and Egypt, causes it to absorb moisture rapidly, and, hence, assists the refrigeration; but the same vessels having been brought over to this country have been found to cool the contained liquor only in a very trifling degree, owing to the state of the air in Britain, which is much less hot, and much less dry, than in the above-mentioned places, therefore much less apt to promote evaporation. One of the Egyptian vessels was tried in London at a time when the temperature of the atmosphere was at a mean; and after about half an hour, when almost three-quarters of the water had passed through it, and had dropped down, the remaining quantity was found barely 3 deg. colder than the surrounding air.

Coolers of earthenware of a similar kind for wine or butter are manufactured in England, and are at present to be found in many of the earthenware shops in London. They are made of a light-coloured porous ware, and of elegant forms, with ornaments in bas-relief. Half an hour before they are to be used, they are put to soak in cold water, of which they will imbibe a considerable quantity. When wanted for use they are taken out of the water, and the decanter of wine placed in them. The evaporation from th surface of the cooler of the water which ha been imbibed, abstracts the heat from th air of the interior, and consequently from th wine. The cooling effect, however, n exceeding a few degrees, is seldom sufficie for wine. Some are made double, with space between, for ice or ice-water. Whe these coolers want cleaning, a hard brus and a coarse cloth with sand only should b used; no soap should be employed.

The process of making ice in the Ea Indies has been particularly described b Sir Robert Barker, *Phil. Trans.*, vol. lx Natural ice is never seen in the warme parts of that country. To procure ice b artificial means, they dig, on a large ope plain, not far from Calcutta, three or fo pits, about 30 feet square, and 2 feet dee each; the bottoms of which they cover abo 8 inches or a foot thick with sugar-cane the stems of the large Indian corn dried. O this bed are placed, in rows, a number small, shallow, unglazed, earthen pan formed of a very porous earth, ¼ inc thick, and about 1¼ inch deep, which, at t dusk of evening, they fill with soft water th has been boiled. In the morning, befo sunrise, the ice-makers attend at the pi and collect what was frozen in baske which they convey to the place of preserv tion. This is generally prepared on som high dry situation, by sinking a pit 14 or 1 feet deep, lining it first with straw, and th with a coarse kind of blanketing. The ice deposited in this pit, and beat down wi rammers, till at length its own accumulat cold again freezes it, and forms one sol mass. The mouth of the pit is well secur from the exterior air with straw and blanke and a thatched roof is thrown over the whol The quantity of ice formed by the meth above described depends on a light atmo sphere, and clear serene weather. Thr hundred persons are employed in this ope tion in one place.

At first sight, this curious process m appear to be an effect of evaporation; b this is not the case; for it is remarkable th it is essential to its success, that the straw which the vessels are placed should be dry; whereas, if evaporation were concerned in the congelation, wetting the straw would promote it. When the straw becomes wet by accident, it is obliged to be replaced by dry straw. The explanation of this process was involved in mystery till Mr Wells published his celebrated observations on dew, which have afforded a solution of the phenomenon. The earth is continually losing heat by radiation, and it loses most on clear starlight nights, when there are no clouds to intercept and send back the rays of heat. The straw, like all filamentous substances, is a good radiator of caloric, and it is in consequence of the heat that is thus given out by it into space on clear nights that the air is formed. When the weather is windy and cloudy the effect does not take place.

The last method of cooling liquors that remains to be mentioned is obtained by the solution of salts. It has been long known that certain substances generate a considerable degree of cold, particularly nitre, sal-ammoniac, Glauber's salt, muriate of lime, and several others. But most of these salts are so dear in Europe, that they are seldom made use of in this way, except in particular experiments, when it is wished to produce an intense degree of cold by a powerful freezing mixture.

In India, where nitre is very cheap, and the heat of the climate prompts the inhabitants eagerly to adopt every possible method for counteracting it, the cooling of liquors for the table, by means of the solution of nitre in water is very common. To effect this, the wine, water, or any other liquor, is put into a metallic bottle, generally a pewter one, having a pretty long neck. A tub is partly filled with water, and a quantity of nitre is thrown into it. Then the operator holds the bottle by the upper end of its long neck, and gently moves it about in the saline mixture while dissolving, which cools the liquor to a very considerable degree. As salts will produce cold only during their solution, when the first quantity has been thoroughly dissolved in the manner described, more nitre must be added; and when the water is completely saturated, so as not to be capable of dissolving mo salt, the bottle, if to be cooled farther, mu be removed to a tub with a fresh saline mi ture. The nitre may be recovered again f the next day by exposing these solutions i shallow pans to the hot sun of that country.

Sal-ammoniac would answer for this pr cess; but a mixture of nitre and sal-ammoni is the most effectual by which a bottle wine may even be cooled down to 32 de The best proportions are five parts nitre, fi of sal-ammoniac, and sixteen of water. Th solution by itself will lower in temperatu several degrees below the freezing point; b when it has to abstract the heat from a vess with wine put into it, it will not then becom so cold.

In order to cool a bottle of wine in Londo from the usual temperature, 50°, down 32°, a pound of nitre, another of sal-ammoni and a proportionable quantity of water will required; but to cool it to a considerab degree, half the quantity of salt will sufficient; even this is too much for ordina use, and mixtures of this kind in powder a sold in London for the purpose, by mo chemists, from whom may also be had variety of freezing apparatus for making i creams.

An intense degree of cold is produced a mixture of snow and salt in equal part The salt causes the snow to melt in cons quence of the attraction which it has for wate even in the frozen state; and as they bot unite, the snow is dissolved into water, an the water dissolves the salt, so that bot become liquid. The cold thus generated no less than 32° below the freezing point, down to zero of Fahrenheit's thermomete and is a much more intense degree of co than is required for the ordinary purposes cooling liquids for beverage; but it may useful to know how to increase the usu degrees of cold upon occasion. Pounde ice will do nearly as well as snow; any su stance having a very strong attraction for wat may be substituted for the salt.

If chloride of calcium (formerly call muriate of lime) be mixed with snow, a st greater degree of cold will be produced;

this means 50° below the freezing point has been obtained, which is sufficient to render even mercury a solid mass; consequently such a degree of cold can be measured only by a spirit thermometer, spirits of wine never freezing. The principle of this is the same as the last, the great attraction which chloride of calcium has for water.

No means have been discovered for depriving bodies of all their heat; nor is it kno what quantity they may still contain af these experiments. Intense degrees of c like these act with the most destructive a rapid effect upon the living body; and handle frozen mercury is described by tho who have attempted it like touching red-h iron; the skin would be destroyed, and t part become frost-bitten.

THE

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A FEW MORE WORDS ON THE GAME LAWS.

THIS subject has been for a long time discussed, not always with the best taste on the part of the disputants, and certainly not seldom with a great lack of judgment on the part of some of them. The discussion out of doors has culminated in a discussion—not a decision—in the House of Commons.

What with discussion in and out of the House, enough, many are disposed to think, has been said on the subject. But although this is to a certain extent true, still it may not be amiss to add a little more to the discussion—especially that what we intend to add is of the briefest. And first, we would take most heartily an exception to the mode of dealing with the subject, too often taken by many—namely, as if it was entirely a one-sided political question, which it is not, and not purely a many-sided social one, which it is. It is absurd to write and talk about the subject as if the game-laws were an unmixed evil, and that that evil was perpetuated by that class which has been as coarsely as incorrectly designated as the "bloated aristocracy." Now, the truth is, that "game preserving," by which phrase we believe we include all the evils, or the main evils that arise from the laws, if it is an "unmixed evil," as some say it is, is just as heartily carried out by those who have no claim to aristocratic position, as by those who have.

We know some who are as keen "preservers," and yet who talk glibly of the "rights of man," as those who say little on this subject, however much they may think about it It would be a good thing, therefore, in the discussion which is certain again to take place i the subject was honestly discussed on its merits; not as one made a mere handle o to serve party purposes and to increase party dislike.

There has been of late an increased force and pith added to the assertions of those who maintain that there is an absolute "necessity for legislation to put an end to the evils of the system." But the question may well be asked, are the evils of a class likely to be remedied by legislation, or do they not rather come under the category of cases which can be best settled by private agreement? The question is, indeed, admirably answered in an article on the subject which we append from the *Scotsman*, an article which we believe to be the most common-sense exposition of the whole matters in dispute yet published. It appears to us, with the writer of this able paper, that much of the evil may be prevented by arrangements between landlord and tenant, that is, by the leases granted by the former and adopted by the latter. And it is certainly a mos suggestive thing that the main grievance arises, or is supposed to arise from "those nuisances," hares and rabbits which are not, in fact, protected by the game-laws at all, with which the game-laws, *as laws*, have nothing to do, and with which any farmer can deal on his own land as he likes. If, then, the game-laws have no connexion with this grievance, the grievance must arise from some other cause, defects in the lease or otherwise. If the lease is defective, it is obvious that the lease may be made good. Blame the lease, but do not blame the laws. It is eminently worthy of notice what the writer of the article in question says on this very point to which we refer, and it is also as eminently worthy of notice what he says with reference to the fact, that without any game laws, there would be just as strict game clauses; just as we find that without any laws affecting the cropping of farms, there are at this day cropping clauses—and many of them—in leases which are as great grievances as any arising from game. But it has been objected that the game landlords, as they are called, will insist upon game clauses in their leases, and that this insisting is an injustice. It is obvious that this is a matter which can never be settled satisfactorily by any legislative enactment. It is one of what may be called ordinary trading between man and man. If one does not like the terms of the bargain, why accept it? For, be it noted, that if the game-laws were done away with to-morrow, the love of game would remain as strong as ever, perhaps stronger, and every conceivable care would be taken to preserve it; and we can conceive of no law which could be honestly enacted which would prevent any landlord and tenant entering into an agreement to do certain things otherwise legal for certain considerations. The love of game seems to be peculiarly a "British institution," and it will be a long time, indeed, before the notion will be eradicated from the minds of their possessors that they are property, and have therefore a claim to be put into agreements as valuable commodities. The game-laws, moreover, are not an unmixed evil, they carry with them some good points. Without them, and if every one had the right to destroy game as he liked and when he liked—if indeed such a thing could be done in presence of the law (trespass now in existence—we should soc see the necessity of having legislative enac ments to give security to the breeding of an mals, which form and which will remain, wha they are now, an esteemed part of the foo of the people. Legislation is, for the presen some distance off, one session, if not more and it would be well if, in the meanwhile, th whole subject could be discussed with calme views than it has yet been generally favoure with; when the result of this possibly may b that it will be seen that legislation may be dis pensed with, at least legislation of that mis chievous character which some seem so desirou to have carried out. If legislation is to be th result of all the discussion, we believe tha it will only be good if it is a legislation th result of "compromise and fusion," rathe than that in which alone the victory or th defeat of the opposing parties is alone though of. In the most of things, the middle cours is the best to follow, and, probably, we sha yet find, that this vexed question is no excep tion to the rule.

Although the *Scotsman* is a paper whicl we believe, is not considered an oracle, in general way, by the landed gentry, it ha always taken a very common-sense view c what agitators are pleased to call "the iniqu ties of the Game-laws." It is, therefore, wit pleasure that we reproduce from its column the following article bearing upon the subjec we are now discussing:—

> "Now that the hurly-burly's done, though only fc the present, and though the battle has been neithe lost nor won, there is perhaps a better oppoi tunity than for a long time past to venture a fe words of truth and soberness upon the game questior For some months that question has been rather to hot to touch, and so many hammers have been goin upon it that there was no chance of a bystander get ting in a stroke; but now it is obviously getting coc again, and the hammerers are a little fatigued, beside not hammered the thing into any sort of shape. Ther was great clanging lately in the House; but, instea of any progress being made, the whole work wa broken off in the middle, or rather at the begir ning, and there will probably be no more about until next year. Throughout the Parliamentar session the battle has been triangular, or rather qu drangular—the *status quo*, and three different pr posals of change or reform. The result has bee

the same as in the unsatisfactory engagement mentioned in "Hudibras," where

> "All sides having had the worst,
> They parted as they met at first."

There must, we humbly suggest, be some reason for this. Can it be that all sides are more or less and in various degrees wrong and unreasonable—that there is a mixture of good and bad in all the ideas or projects; and that the solution will be found at last (which last may now come sooner than before seemed likely), not in victory and defeat, but in compromise and fusion?

It is so far well that there is already a sort of practical unanimity upon two points, viz., that there is an evil to be redressed, and that that evil is of a limited size and ascertained form. That game-preserving is an evil that has increased, is increasing, and ought to be diminished, is agreed on all hands; or, at least, if anybody thinks, nobody says, that things are well enough as they are. It seems also pretty well agreed that the mischief is chiefly confined to ground game—that is, to hares and rabbits; at least, both the speeches and the bills have been almost entirely occupied with these two animals. But when we come to the remedy, we have fierce controversy both as to the general principle and as to the particular modes. It is disputed—and yet, as we think, not so much disputed as it might be—whether the evil is caused, and therefore can be cured, by the game laws. Is it not a matter of leases rather than of laws, of private contract rather than of public legislation? Then the House of Commons has been distracted by three different measures proceeding, or seeming to proceed, upon three different principles. Mr M'Lagan, not inaccurately, but not quite fully, described the principle of Lord Elcho's bill as giving the game to the tenant "unless" there is an agreement to the contrary, and the principle of Mr Loch's bill as giving the game to the tenant, "notwithstanding" any agreement to the contrary. Between those two proposals, the member for Linlithgowshire stood up, and hit out against each, right and left, with much neatness and some force. But it seems to us that he failed not only in shewing that at least one of the competing proposals is wholly evil, but in making it clear what is the principle of his own bill—unless, indeed, he is prepared to admit this definition, that he would let the owner and the tenant divide the spoil in any way they like upon parchment, and then would enable or allow a third party to appropriate the whole spoil in practice.

There are some very good reasons both in theory and experience favouring the position that, after all, the cause, and consequently the cure, are not in laws. This is, in the main, a dispute between the owners and the occupants of land, and there is no law on the statute-book, at least as to hares and rabbits, preventing those two parties from doing in this matter whatever they may agree upon. On the contrary,
whatever agreement they may make, the la
will acknowledge and equitably enforce. But th
it is said that bargains are made between landlord a
tenant which would not and could not be made b
for the existence of the Game-laws, and which a
prejudicial to the tenants', if not also to the publi
interest. Even if this were correct, it would not
enough, for nobody can say that the Game-laws co
pel, though they may enable, any man to enter in
any contract whatever. But in the midst of the noi
it seems almost forgotten that the Game-la
have as nearly as possible nothing to do wi
hares and rabbits, which are substantially t
only things in dispute. At this moment, lan
lords or tenants, or any person authorized by the
are quite free to kill hares and rabbits in any way a
at all seasons without restriction or tax.
M'Lagan's panacea is simply to strike hares a
rabbits out of the game list—are they not practica
out of it already? It is not easy to understand h
such a state of the law can be a great grievance a
oppression; and it is quite easy to understand how
farmer may suffer great hardships from hares a
rabbits, and yet the law not be blameable—in ot
words, leases may contain follies which the law neit
contains nor can prevent. Mr M'Lagan himself, wi
out intending it, gave a very striking illustration of t
latter truth. He told the House of Commons that,
the great majority of leases, the clauses relating to t
rotation of crops are much more injurious to agric
ture, to agriculturists, and the public than the clau
relating to game. Well, there is no cropping law
the statute-book, and yet there are these pernici
cropping clauses in the leases. What right, then,
Mr M'Lagan to assume that, if there were no Ga
laws on the statute-book, there would be no ga
clauses in the leases?

The idea in Mr M'Lagan's mind on this poin
one which, if it could be realized at all, which
doubt, could be realized only by means of some s
plan as Mr Loch's, which brings in the law to ena
persons to break their private agreements. Ther
no way of preventing two men in such positions
owner and occupant of land agreeing that one, fo
certain consideration, shall allow the other cert
privileges; but Mr Loch proposes that, after suc
bargain has been made, either of the parties may br
it, retaining the consideration, yet refusing the pr
lege—pocketing the purchase-money, and withhold
the goods. Mr M'Lagan had little trouble in de
lishing this proposal; and he might have gone furt
in his objections. He said, that to prevent
make void contracts regarding game between la
lord and tenant would be to "violate in
most flagrant manner the rights of property."
might have added, that it would be to viol
the right of the occupant as well as of the
prietor. It is quite possible, it is quite c
mon that a landlord may be willing to pay
tenant for the control of the hares and rabbits e

land, not only much more than the value of the animals, but much more than the amount of the damage they could possibly inflict on the tenant. We are aware of a case of a farm let the other day, where the choice of the tenant was between a rent of £600 with, and of £450 without, the control of the rabbits; he chose the latter as the more profitable arrangement —and why should, how could, the law prevent him? Mr M'Lagan comes on a harder substance in at least one of the clauses of Lord Elcho's bill. He objects, even with bitterness, to the proposal to assimilate the law of Scotland to that of England, by bestowing the legal right to the game upon the tenant, "unless" there is an agreement to the contrary. Mr M'Lagan says that this is a "specious concession"—that "it gives a boon to the tenant in one line, and deprives him of it in the next." It does give the tenant a boon, and it does not "deprive" him of anything whatever—it only refrains from preventing him depriving himself of it for a consideration. Indeed, in objecting to this proposal, Mr M'Lagan is driven to adopt that very principle which, as embodied in Mr Loch's bill, he denounces with so much, and yet not too much, vehemence. Another objection he makes is, that, though this principle is law in England, it has not resulted in the prevention of the over-preservation of game. That is too true, but amounts to a proof not of the unsoundness of the principle, but of the unsoundness of the argument, that this is a matter almost impotent, and private contracts almost omnipotent. Nothing, indeed, has been more perplexing throughout this controversy than the violent repugnance shewn by some people to a proposal for giving them legal possession of the whole bone of contention, to keep or to sell. Displeased with the proposals of both his rivals, what does Mr M'Lagan himself propose? He denounces, for good and obvious reasons, Mr Loch's proposal to legalize the violation of private contracts; for reasons which are not obvious, and cannot possibly be good, he denounces also Lord Elcho's proposal, that, in private contracts the law shall give the tenant a great advantage by making him the owner and seller instead of the purchaser. He himself would have the whole matter of private contracts to stand as it is, and (except as to an important question of judicature and a petty one of penalties) would leave the Game-laws also as they are, with the exception of deleting from them the names of hares and rabbits. Let us see how this would work, or can be intended to work. The owner and the tenant make a bargain that the one or the other, or both in more or less equal division, shall have the hares, which is what can be done and is done at present. The change effected by Mr M'Lagan's bill would be, that it would render it, if not lawful, at least easy, for a third party to come in and take the hares from both owner and tenant. If that is what is wanted, why not make it part of the private agreement?—what use for a change in the law? If that is not what is meant, why stipulate that the hares and rabbits shall be yours, or min or ours, and then ask that the law shall affo facilities for their being taken from all of us by son person or class not convenient to name? Mr M'Laga without saying what he does mean, says that he do not mean that the hares and rabbits which have bee bought and sold or agreed about as between own and tenant, shall be allowed to fall to the poachin interest; but on this point his explanation is very u satisfactory, and his argument curiously illogica "Poaching," he says, "is most prevalent where gam is most abundant," and as the change of the law h proposes would, he expects, reduce game, it woul also reduce poaching. But, then, if it did reduc game, it could only be by increasing poaching in th first instance, and poaching would only decrease b cause it had decreased game—the game which M M'Lagan, nevertheless, would have disposed of t free bargain between owner and tenant. This much the same thing as discouraging hous breaking by allowing house-breakers to begin b carrying away anything portable and valuable fro the house. No, says Mr M'Lagan, that would b prevented by the Trespass-laws, and by certain o Scotch Game Acts, which would still remain in forc "excepting as to hares and rabbits." Now, that just what we mainly object to, in the interests of th public. It may or may not be reasonable in M M'Lagan to believe in the possibility of allowing a and sundry to come shooting hares and rabbits with out danger to their shooting anything else—that is matter for those interested in game. But it certainl would not be reasonable to believe that if poachin is to be prevented by preventing what is technicall called "trespass," the restriction will not fall muc more on the public than on the poachers—that is matter for the public to consider, and consider wel If the law were such that neither owners nor tenan could prevent persons going over their land wi dogs and guns, except by calling into operation a la which enables them to prevent all persons going ov their lands, the public would soon suffer greater lo and vexation than arises, if not even from game pr serving, at least from the Game-laws.

There are, however, some good things in M M'Lagan's bill, though that is said without prejudic to other proposals. Would a bill comprising the fo following enactments not do about as much f remedying this evil as can be done by law?—

1. All game to belong in law to the cultivatin tenant, unless where he shall have expressly, and for consideration, parted with his legal right.

2. The jurisdiction in all cases concerning game be with the Sheriffs, and not with the Justices Peace.

3. A cheap and expeditious mode to be provided f assessing damages inflicted on the tenant by the exce or increase of game under the owner's or his gam tenant's management.

4. A similar or the same provision as to damag

caused to tenant by game which there is reasonable ground to believe was reared on and came from closely contiguous land, not the property of the tenant's landlord."

That our readers may be in full possession of the arguments used both for and against any change in the existing laws, we append a carefully revised report of the recent discussion in the House of Commons on Mr M'Lagan's Game Laws (Scotland) Bill.

Mr M'LAGAN, on rising to move that this bill be read a second time, said—I think it proper to explain to the House that though there have been this session several discussions on the subject of the operation of the Game-laws in Scotland, some of which have been unusually lively, there has been no discussion on the principles of the three bills before the House. Notwithstanding this, I would not have ventured to inflict another discussion on the question without first consulting with the Government and those Scotch members who have shewn an interest in the matter, both of whom have declared to me that a discussion on the bills would be desirable. I have to ask you and the House not to enforce too rigidly that Standing Order which forbids remarks on bills that have been introduced but are not immediately under discussion, for, by our being allowed to allude to the other two Game bills, we shall be able to finish our remarks on the three bills, and thus economise the time of members. I shall not trench upon the indulgence of the House by attempting to prove what is generally admitted, that there is a wide-spread discontent and dissatisfaction on the game question among the tenantry of Scotland. And the discontent which so generally prevails is not of recent origin, but it arose with the enactment of the Game-laws, which are founded on the worst kind of class legislation; for they are simply the protection of a privilege, and the unprivileged have always a feeling of jealousy and discontent against those privileged by the law. Hence it is that since the establishment of these laws, a gentleman, however popular in other respects, has been sure to lose some of his popularity by being a game preserver. In this respect, then, the Game-laws may be said to be a sentimental grievance, which is not always the least dangerous in an artificial state of society. The evil complained of is the damage done to crops by an excessive number of hares and rabbits. The proximate cause of this evil is the over-preservation of game generally, and the ultimate cause is the protection afforded to these animals by the Game-laws. Various remedies have been proposed for abating this evil. I believe that there would be no complaint were the landlords to concede to their tenants an equal right to the killing of the game on the farms occupied by them. Were this done there is no doubt that the tenants would be upon their honour to have a fair head of game upon
their farms, so that landlords would never have
complain of a bad day's sport from the want of gan
There would be mutual confidence between the
instead of that distrust which prevails at present, a
the services of that inviter of dissension, the gan
keeper, would be in a great measure dispensed wi
But, Sir, as I do not think the proprietors are su
ciently educated up to the point which would enal
such an arrangement to be made, I shall shortly
mark on the different remedies proposed for the e
One proposal, then, is, that a tenant shall have
right of killing hares and rabbits on the farm occupi
by him, notwithstanding any agreement to the contra
The two words "unless" and "notwithstanding" c
stitute the difference between these two proposa
In the first proposal, the rights of property are
spected; in the second, they are violated in the m
flagrant manner. The first proposal (Lord Elch
Bill) is an assimilation of the laws of Scotland to tl
of England. It gives a boon to the tenant in one li
and deprives him of it in the next. The second pr
fers a specious concession to the tenant, without tou
ing upon the great cause of the evil complained
The first, if it should become law, will prove to be
a sham. The second will utterly fail in accompli
ing the object the supporters of it profess it to be th
desire to attain. The first has been tried in Engla
and found wanting, for there complaints of the evils
game preservation are as rife as they are in Scotlan
and my hon. friend the member for East Norfolk, w
so ably and fairly represents the tenant-farmers
England, suggesting that ground game sho
be given up to the tenants, and giving
opinion of an English land-agent that hares a
rabbits should be struck from the game-list. And
is a mere mockery to say that it shall be lawful fo
tenant to kill hares and rabbits in Scotland, where
right of doing so is not specially reserved by the p
prietor; for there is not a lease drafted in Scotla
in which the game is not specially reserved by
proprietor. The great objection I have to the seco
proposal is that it violates the rights of property
interfering with private agreements. It has b
said that there is not interference with the rights
property here, as game is not property. True, S
live game is not property, but the law declares tl
dead game is the property of the proprietor on wh
lands it is killed. Besides, land is property, and
right or privilege of killing game is attached to
land; and if a proprietor can get 2s. per acre m
for his land from an agricultural tenant by trans
ring to him this right of killing game, am I to
told that there is not an interference with the rig
of property if the Legislature should prevent
proprietor and tenant making the agreement? T
reason given for this interference with priv
agreements as regards game is that they
contrary to public policy. Now, Sir, I at o
admit that where there is such an abuse of the rig
of private property as to cause a public nuisance,

law should interfere to prevent that abuse. I also admit that the over-preservation of game is contrary to public policy and is a nuisance. If I were not of this opinion, I would not now be using my humble efforts to abate the evil. But in no country are the rights of property more respected than in this, and there is consequently no country in which a man may hold property with greater security. The Legislature should be and is very jealous of doing anything that can weaken that security; and when such a nuisance as game preservation is complained of, we should not resort to the interference of these rights until we have certified ourselves that there is no other mode by which the nuisance can be abated. In this particular case we have the remedy placed to our hand. The evil complained of is the over-preservation of game. This is caused by what? By private agreement about game in leases? These may do so in part, and proximately; but the main cause is the Game-laws, which in this respect are inexpedient, impolitic, and unjust. The real remedy, then, for the evil is an extensive modification of these laws. The advocates of the second proposal which we are now considering scarcely touch these laws. On the contrary, by making an attack on the sacred rights of property, they throw dust in the eyes of the public, withdraw their attention from the real cause of the evil, and perpetuate laws which are admitted by all to be productive of a nuisance. Retain the Game-laws, and prohibit private agreements about game, and the evil of over-preservation will scarcely, if at all, be abated. Abolish the Game-laws, and retain private agreements, and we shall hear no more complaints of the damage done by game. The Legislature, then, and not the private individual, is most to blame in this matter, and to the Legislature I have come seeking redress. If this mode of dealing with agricultural grievances by interfering with private agreements were to be sanctioned by the Legislature, where shall we end? The very next abuse to the game-preserving clause in the lease is that which refers to cropping. I have no hesitation in saying that in the great majority of leases the cropping clauses are so absurd, and so injurious to the interests of landlord and tenant and to the public at large, and tend so much to retarding the progress of agriculture, and diminishing the produce of the land, that they might with greater justice be said to be contrary to public policy than the game clauses. But is the House prepared to take this matter into its own hands, and lay down rules for this cropping of land throughout the kingdom? I have said that if such a proposal should ever become law, it will fail in accomplishing the object its advocates aim at. If it is intended to apply it to existing agreements it will perpetrate a great injustice, for some proprietors are in the habit now on letting their farms to ask the tenants to offer such a rent as they think proper, the game being reserved by proprietor; and the farms have been let to the tenants on this condition 2s. or 3s. per acre cheaper than they would otherwise have got them at. If, then, this proposal become law, the clause about game would be null and void. This would be manifestly unfair. It would be but just that, in the event of such a proposal becoming law, to declare that, from and after the passing of the Act, all leases and agreements of leases should terminate, and parties should be allowed to make any new agreement they think proper. In the case of new leases, there will be little abatement of the evil of over-preservation, for the landlord would, on letting the farm, have a tacit understanding with the tenant that, notwithstanding such an Act, he would let the farm only on the condition of reserving the game for himself; and owing to the great demand for farms, there would be found not a few tenants who would take the farm on that condition. No mention would be made in the lease about game, but the tenant would be put upon his honour. The honest and honourable man would consider himself as much bound by his word as by any written agreement. The dishonest and dishonourable would suit his convenience as to the fulfilment of his part of the contract, and thus such a proposal holds out a premium to dishonesty. But every landlord would not be content with the simple word of the tenant. He would ask for some security for the fulfilment of the agreement, not only by himself, but by any one who may succeed him during the currency of the lease; and the security which he would demand would be that the lease shall terminate at the landlord's pleasure. In short, the effect of such a proposal becoming law will be to do away with leases on some estates, which would be worse than the Game-laws themselves. So much is it dreaded by some true friends of the tenant-farmer, that the passing of such a law would be followed by the doing away of leases, that one of them is prepared to move in Committee, if any bill embodying such a proposal should ever get that length, a new clause that from and after the passing of this Act a tenant entering upon a farm shall keep possession of the same for at least nine years, notwithstanding any agreement to the contrary. There is no doubt that the Act embodying No. 2 proposal would be useless without such a clause, and an Act passed with such a clause would solve the Irish land question. And the right hon. gentleman the Irish Secretary would have to thank the Scotch Game-laws for cutting the Gordian knot of that difficult question, for all that is wanted is to give the Irish tenant fixity of tenure by a short Act as follows—"From and after the passing of this Act the tenants in Ireland shall remain in possession of their farms for at least sixty years, nothwithstanding any agreement to the contrary." I shall now shew how useless such a bill would be if passed into law. The bill provides that a tenant shall have full authority to kill hares and rabbits on the lands occupied by him, any agreement or covenant with the lessor notwithstanding. Mark the words, with the lessor of such lands, to the contrary notwithstanding, any agreement between the proprietor and tenant about game shall be illegal. But the bill does not

prevent the tenant from transferring the right or authority given him to a third party. He may sell this right to a third party, who shall then transfer it again to the proprietor; and in such a case, what difference would there be in the preservation of game if this bill were to become law? and now, in other words, the bill debars the tenant from making any agreements with his landlord about hares and rabbits, but allows him to make any such agreement with any other party he may think proper. I have now remarked on three remedies proposed for the evil arising from the over-preservation of game. I come now to propose a fourth—viz., that embodied in the bill introduced by my hon. friends the members for Aberdeenshire and Dumbartonshire and myself. The distinguishing feature between our proposal and the other is that by it hares and rabbits are struck out from the game list. Hares and rabbits are no longer to mean game in the meaning of the Game Acts. We have taken the simple remedy which lay to our hands, and in doing away with the cause we have the certain expectation that the effect—that evil of over-preservation of game so justly complained of—shall cease. My hon. friend the member for Aberdeenshire stated in his maiden speech in this House that no measure would be satisfactory to the tenant-farmers of Scotland which did not provide for taking hares and rabbits from the game list; and as this is the only bill which proposes that hares and rabbits shall be taken from the game list, it is the only measure proposing to amend the Game-laws in Scotland which will be satisfactory to the farmers of Scotland. I have heard no objections made to the sufficiency of this clause in remedying the evil. On the contrary, many friends have expressed fears that the clause, if it should become law, will be too efficient; in fact, that it will lead to the extirpation of hares altogether. It will no doubt most effectually prevent an excessive number of them, but it will leave a sufficient number for legitimate sport, without them doing much damage to the farmers' crops. The great objection urged against the clause is that it will encourage poaching and trespassing. Now, poaching is most prevalent where game is most abundant. It won't pay a poacher to carry on his trade where game is kept in moderate quantities; and as it is admitted that the effect of this bill is to keep down the number of hares and game, it cannot at the same time encourage poaching. Then as regards the objection to the clause on account of its encouraging trespass, the law as it exists at present, and as it will remain even if this bill pass, will be sufficient to prevent trespass. We have at present the law of trespass that any one leaping a fence is liable to a penalty of £10 Scots, in addition to a sum for any damage he may cause to the property. Again, the Act 1707 and 1713 provides that no common fowlers shall presume to hunt on any grounds without a subscribed warrant from the proprietors of the said ground, under penalty of £20 Scots, besides forfeiting their guns and nets to the apprehenders or di
coverers. Besides, the Night Poaching Act 14 Geo. IV
cap. 69 provides that if any person shall by night u
lawfully enter or be in any land, whether open or e
closed, with any gun, net, engine, or other instrume
for the purpose of taking or destroying game, t
offender shall, upon conviction before two Justices
the Peace, be committed to the common jail or hou
of correction, and kept to hard labour for a period n
exceeding three calendar months, and at the expiry
such period may be required to find sureties for his n
so offending again for the space of one year. Agai
by the Acts 2 and 3 William IV., cap. 68, any pers
whatsoever committing any trespass by entering
being in the day time upon any land without leave
the proprietor in search or pursuit of game shall,
being summarily convicted thereof before a Justice
the Peace, forfeit and pay such sum of money not e
ceeding £2 as to the Justice shall seem fit, togeth
with the costs of the conviction. These Acts are l
untouched by this bill in every respect, excepting
regards hares and rabbits. Clause 4 provides for t
transference of all prosecutions under the ga
laws from the jurisdiction of the Justices of the Pea
to that of the Sheriffs of the County. In suggesti
this change, I wish it distinctly to be understood th
I do not intend to cast the slightest reflection on t
Justices. My firm belief is that in the discharge
the delicate duty imposed on them they are animat
by the most conscientious feelings, and they endeavo
to perform these duties with a strict regard to ju
tice. But still they are merely men generally u
trained to the sifting of evidence, and to the drawi
of conclusions from such evidence, and to that exa
ness of thought which legal training and practi
gives to the mind; and hence they are more apt to
carried away by feelings than regularly train
lawyers. Now, I have said before that the Game-la
are a protection of privileges more than of propert
The privileged, which is too often also the game p
serving class, are the judges of the unprivileged clas
and the evidence required for conviction is not
much evidence of the committal of an act as eviden
of the intention to commit one. It will at once
conceded to me that the worst men to be selected
judges in such cases are those most liable to
influenced by prejudice and feeling, and that
Stipendiary Judge is preferable to a Justice of t
Peace. Again, it is always desirable that the peopl
and particularly the accused, should have confiden
in the administration of the law. Now, I ask wh
confidence can a man accused of trespass under t
Game Acts have in the tribunal before which he
brought for trial when he sees on the bench as o
of the judges the very man for trespassing on who
lands he is brought to trial, and who may at the sa
time be one of his accusers? And if the gentlema
as is generally the case, declines to take his seat
the bench on such an occasion, the accused still s
before him as judges the neighbours and most intima

friends of the accuser, all of whom are noted in the district for their avowed hostility to the class to which he belongs. So jealous is the Legislature in keeping up confidence in the administration of the law, that no occupier, or father, son, or brother of an occupier of a factory, can act as a Justice of the Peace under the Factory Act. No coalmaster or tenant of coal works can act under the Mines Act, no miller or baker under the Bread Act, and no brewer under the Licensing Act. Clause 5 proposes to abolish cumulative penalties under the Game laws. At present a person may be prosecuted in one action for the penalty imposed by the Act 1621, and for the penalties of the Act 13 Geo. III., cap. 54, and of the Day and Night Poaching Acts, besides being liable for prosecution for shooting without a license. This is quite an anomaly in our legislation, and an outrage on justice, and therefore it is proposed to abolish cumulative penalties under the Game Acts. The 6th clause provides for compensation being given to tenants for damage to their crops. At present the process for obtaining legal compensation for game damages is very tedious and very expensive, so much so that very few tenants ever attempt it. The case is first brought before the Sheriff Court. It may be appealed from it to the Judge Ordinary, then to the Inner House of the Court of Session, and then it may be carried to the House of Lords. The object of this clause is to make all game prosecutions final at the Sheriff Court. The course of procedure is fully described in the bill. It has been suggested to me that I should add a clause by which an owner or occupier of any lands shall be empowered to obtain from a neighbouring proprietor compensation for damage done to his crops by hares and rabbits from the lands of the last mentioned proprietor. This appears at first sight practicable and reasonable, but a little consideration would soon shew that such a clause would be quite unworkable, and might be productive of great hardship and injustice. As regards rabbits, which do not travel far, and may be easily traced to their holes, such a clause may be worked out; but before you could apply it to hares you would require to make them property, and I believe that the bill of the hon. member for Wick is the first in which there has been any attempt made to make hares property. But how can this be done? How can any man identify a particular hare as being his property? To facilitate the carrying out of this clause, it would be necessary to insert a provision that every proprietor shall, after the passing of this Act, be bound to attach his crest and monogram to every hare born and reared on his estate. I have to thank the House for the patience with which they have listened to me. Whatever may be the result of this discussion, I may state that it gave me much satisfaction to hear the right hon. gentleman the Home Secretary announce that it was the intention of the Government to introduce a bill next year on this important subject. I trust that when that bill is introduced we shall find that
full effect has been given in it to the strongly-express
opinions of the tenant farmers of Scotland on t
subject.

Mr FORDYCE—Looking at the intention of t
Home Secretary to legislate on this question ne
session, it would, I think, be fatal to press the b
further this session. I beg to thank the Home Secr
tary for the assurance he has given us of his intenti
to legislate next session. I am expressing the opini
of the people in Scotland in saying that this course w
be more agreeable than a Royal Commission. The pr
visions of the bill of the hon. member for Linlithgo
shire have been for two years before the country, a
have received the universal approval of the differe
agricultural bodies in Scotland. The great recommend
tion of the bill is this—that no objection on the grou
of principle can be taken against it. It does not pr
pose to interfere in any way with the law of contra
but simply to remove the protection which has be
given by statute law to game. The only objection I fi
to it is on the score of trespass, but that would n
practically arise in the working of the measure. I regr
some of the epithets applied to the other bills—for
any bill should meet with the enthusiastic support
the tenantry of Scotland, it is the bill of the ho
member for Wick; and I would certainly support
on this ground, as also because it is a bill the pri
ciple of which is approved by the Lord Advocat
The principle of the bill of the hon. member for Wi
is perfectly unobjectionable. If a bill were introduc
to treat hares and rabbits as a nuisance, and applyi
the principle of the Factory Acts, it would be an i
provement. We are not sufficiently impressed wi
the feeling that exists in Scotland upon the gan
grievance. In many counties in Scotland it has giv
rise to a state of social warfare, the result of which
to prevent all co-operation. I do venture to expre
a hope that next session we shall have a bill to whi
we can give an undivided support.

Mr M'COMBIE said—As the Government have no
agreed to bring in a game bill for Scotland, I ho
they will make it such a measure as the tenant-farme
can accept. For my part, I stand by the Aberdee
resolutions—viz., "That any measure to be regard
a settlement of the question must provide that n
only the occupiers of arable farms have the right to ki
hares and rabbits, but also declare all contracts f
their preservation illegal and contrary to the publ
good." Representing, as I have the honour to do,
division of perhaps the largest cattle-breeding an
cattle-feeding county in Britain, where turnips,
which hares and rabbits are especially destructive, a
extensively grown, and speaking in the interests
my constituents, and of the tenant-farmers of Scotlan
generally, I have to say, Sir, that they look to th
House for substantial relief from this grievous injusti
to which they are subjected; and if their modera
demands shall now be refused, it requires no gre
foresight to see that the Game-laws will soon be wipe
from the statute-book, root and branch. The tena

farmers will not accept of any measure that does not embody the Aberdeen resolution that hares and rabbits shall be dropped from the game list.

Sir J. ELPHINSTONE—This game question is the greatest imposture that has come before this House. The hon. members on the other side of the House owe their seats to it, and consequently they are determined to support these bills. They bring them forward without any earthly idea of passing them, and having carried them to a certain stage, they let them drop. It is impossible for a private member of Parliament to legislate on this subject. It must be done, if done at all, by the Government of the day, and yet they bring in proposals of a most profligate character ; for when a man says that a tenant-farmer is to go and sign a lease with his landlord in which there is to be a certain provision, and that by the law of this country that provision is to be nugatory, if that is not profligacy, I don't know what is. If any legislation takes place on this subject, it must be proposed by a Royal Commission, and if a Royal Commission is appointed it will shew the gross exaggeration which has taken place. Now, I say that my hon. friends who came into this House upon this question came in upon a grave imposition. I think I know the county of Aberdeen, and I know that where formerly I could kill twenty-five brace of partridges I could now kill no more than five, and where I could kill ten or twelve hares I would not undertake to kill one now. The whole thing is changed. (Hear, hear, from one of the Scotch members.) The hon. member says hear, hear. He sits in this House as the nominee of two of the greatest game preservers in Scotland. Some thirty or forty years ago every one in the county of Aberdeen began to plant their waste lands. Up to that time the country was almost bare of timber, with the exception of a small portion of land. In the course of time woods grew, and these woods now give shelter to the hares which go into them. They have withdrawn themselves from the open country. What has been the result? Towards the end of the season, proprietors of covers assemble their friends and work these covers in a sportsman-like manner, and kill every hare they come across. You cannot find the hares in the open country. This is, as I have stated, an agitation, and a political agitation, and is got up by political agitators and editors of newspapers. The whole thing is a fiction ; and my hon. friend wishes now to withdraw these cases from the jurisdiction of the magistrates. No such case could come before a magistrate on whose land it occurred, as in those cases they always withdraw themselves. It would be a bad thing to deprive the country gentlemen of Scotland of those duties which the same class perform in England. One reason of the estrangement existing at present between the people and the country gentlemen is, that they don't meet each other in the same way as they do in England ; and the jurisdiction given to the Sheriffs of Scotland, I think, goes a great deal too far. If any future legislation is to take place in regard to game, it must be applied to both countries. I have no ide one law applying to one part of Her Majesty's d nions and not to another. If Scotland and Engl are united heart and hand, the same laws should a to each ; and with regard to game, the country ger men of England have a very strong interest in question, as very many of them take shooting-box Scotland. Well, my hon. friend the member for W brings in his bill with its profligate clauses. If word "deer" be added to his bill, it would soon disappear from the House. The whole thir an imposture until the matter is put into the hand the Government to be dealt with as a Governn measure ; and without that, it would simply be h up and flaunted in the face of the constituencies of hon. members in this House who are interested in question.

Sir D. WEDDERBURN—There is only one poin which I would wish to call the attention of the H Secretary. He is the representative of a Scotch c stituency, and it is quite unnecessary to inform hi the feelings of the Scotch farmers on this subject. equally unnecessary to remind him that only the Gov ment can legislate on the subject. The feeling Scotland has not at all declined on this question. read to-day, in a Scotch paper, that the three g bills for Scotland had been shelved in spite of pledge of the candidates on the hustings, and in s of the resolutions of farmers' clubs that we had h the last of these debates. There is no truth in the sertion, but there are grounds for such an opi growing up in the country. We have heard f various persons who are nominal supporters of s game law reform that no legislation must take p until a Royal Commission has reported on the subj and I think it might be worth the consideration of right hon. gentleman whether such a Commis might not now be appointed, in order that during holidays the question may be inquired into, and British people may become acquainted with the f bearing on the question. There can be little d that, unless some such measure is adopted, we ma met from some quarter next session with the objec that neither Parliament nor the country has suffic facts before them to warrant legislation on subject.

Mr SINCLAIR AYTOUN said—It is perfectly use for private members to attempt to bring in bills u this subject. I do not think that a Royal Commis is needed. I think the Government ought to take question up ; but I fear there is some misundersta ing as to the intention of the Government. C former occasion my right hon. friend the Lord Ac cate expressed himself in a manner which led me believe that after the Whitsuntide holidays the Gov ment would express their intentions upon this mat and whether they intended to bring in a bill or next session. But that, it seems, was a mista Since then the Home Secretary did make a guar engagement that the Government would bring in bill, but it was so qualified that it came to nothing. Now, Sir, it is perfectly clear that if the Government do not bring in the bill, legislation on the question is totally impracticable. I think it is incumbent on the Government at once to declare whether they will bring in a bill or not. I do not think it is fair that we should be kept during that period of the year when members return to their constituents in doubt as to what is the intention of the Government. Therefore, we ought to have an unconditional expression of opinion as to whether they intend to bring forward the question next session.

The LORD ADVOCATE—As the time will not allow me to discuss the general question, I will make an observation on what my hon. friend has just remarked. What I suggested was this, that the promoters of these different bills should adjourn the debate which took place until after Whitsuntide, and then consider whether they would not leave the matter in the hands of the Government, with a view to legislation next session. Since that a question has been asked of my right hon. friend the Home Secretary, and he came to the conclusion that the Government would consider this question with a view to legislation next session. Sir, I think the meaning of that is perfectly obvious. The question is one on which there is a great diversity of opinion. Very strong demands are made for redress of what is a real grievance, and the Government are bound to deal with that.

Mr PARKER—I venture, on behalf of the tenant-farmers of Perthshire and elsewhere throughout Scotland, to thank Her Majesty's Government for the promise which they hold out of dealing with this question next year. If there are any two points on which hon. members are agreed, and have been agreed throughout this debate, notwithstanding all the difference of opinion that has existed, the first is that the relation between landlord and tenant should, if possible, have been settled by some other means than legislation, so that by a kinder feeling between the two, a greater regard to each other's interests, and by a moderate use of the rights of property, we might avoid the necessity for interference by law. The second point was, that if there was to be legislation, it was thought right that it should be by Her Majesty's Government, and not by private members. Unfortunately, the relation between the landlord and tenant is not such that we can dispense with legislation, and unfortunately Her Majesty's Government have their hands so full that they are unable to deal with the question this year. That constituted the justification of private members endeavouring to promote a settlement by the introduction of private bills. I think that these bills, although they may now be withdrawn, have not been useless, because, although the discussion they provoked has taken place at most inconvenient hours, so that it has not been possible to do justice to any one of these bills, they have drawn out a certain amount of favourable opinion towards reform in this matter. I do not wish to represent it as more definite than it is which we have received from Her Majesty's Government. I do not know that this question can be left in a better position than this, that we rely upon Her Majesty's Government to bring in a bill next year, and that in the meantime we shall endeavour to bring about as much unity of opinion as possible among the tenant farmers, and also amongst the proprietors, of Scotland, so that next year the question may be in a more favourable condition for legislation. I regret that the hon. member (Mr M'Lagan) who brought forward one of these bills, should have thought fit to spend so much of the short time at our disposal in running down bills of the two other members. I wish also to remark, in reference to what fell from the hon. member for Portsmouth, that he is the hon. member for Portsmouth; and as he has not the honour to represent a Scotch constituency, I think I am for the time better able to say what is the state of opinion in Scotland. Why did the hon. member go to Portsmouth for a seat? If he wished to express the opinions of the tenant-farmers in Scotland, let him first obtain the confidence of a Scotch constituency. It is not true that the people of Scotland do not feel strongly upon this question. I have to-day presented a petition from Perthshire in favour of the bill of the hon. member for Wick, signed by about 700 persons, and one as numerously signed last week. The Ayrshire farmers, as is well known, have committed themselves to the principle of the bill. The Aberdeenshire farmers have just spoken to the same effect through one of their representatives (Mr M'Combie), himself a tenant farmer, and through his colleague (Mr Fordyce). Time does not permit me to say anything, as I was prepared to do, in explanation and in support of the principle of the bill. Let me make this one remark It is a dangerous thing to make such a confession in this House as has just been made by the hon. member for Portsmouth. It is a dangerous thing for representatives in this House to say that our proceedings in any matter which comes before us are an imposture and now that we have more democratic institution than hitherto, there is this temptation that hon. members may go down and promise on the hustings tha which their constituents require, and then come here cool down, and follow their own preferences, and so without any conscious dishonesty, fail to perform thei pledges. What will be the result? One of two things—next time the election takes place either different representatives altogether will be sent to this House, or we shall come back ourselves tied down hand and foot by such pledges that we cannot possibl get out of them. The hon. member concluded b again thanking Her Majesty's Government for the assurance they had given.

The bill was then withdrawn.

ON A CHEAP METHOD OF STEAM CULTIVATION.[*]

BY WILLIAM FISKEN.

THE question, then, is, which of those systems or modes of conveying the power for agricultural purposes is the simplest, cheapest, and most efficient. If simplicity, as applied to machinery, consists in the machine being easy to make, most durable, and does its work cheaply and efficiently, then there can be no doubt that the Fisken tackle has by far the greatest simplicity. In other words, the additional machinery necessary in the double engine set to make the winding-drums move always in a line with the implement draught-rope, costs for daily tear-and-wear and interest, and for carting of water and coal after the engines, about 31s. 8d., when by the endless band system the winding-drums are moved in a line with the draught-rope of the implement, at the daily cost of about 3s. 6d. for tear-and-wear, and interest for cost of apparatus used in the transmission of the power, and for additional coal that may be required to supply the power lost in friction. Would farmers look into the merits of this mode of transmitting power in steam cultivation, they would see that there is no great reason for the complaint of costliness made against steam tackle.

It is always a costly and cumbersome method to have two engines to do work which can be performed as well by one. As the self-moving of the engine not only makes its first cost much greater, but entails the constant cartage of water and coal, so the daily working of the tackle has to be encumbered with all this additional complexity and cost. The greater simplicity and efficiency of the Fisken system are seen also by the less cost of the work done when compared with the double set.

The cost of a double set of 10-horse traction engines and tackle, as seen from catalogue price, is £1284; the tear-and-wear and interest (at 15 per cent.) on whic £192, 12s. per annum, allowing 90 days w for the tackle, gives 42s. 9d. for each work day. The five attendants, at 2s. 6d. ea gives 12s. 6d. per day, to which have to added 12s. 6d. for coal, 1s. for oil, and for cartage of water and coal, making total cost per day, 74s. 9d. Assuming 9 a as the average day's work of heavy ploughi the cost, per acre, becomes, with the dou set, 8s. $3\frac{2}{3}$d.

The cost of the Fisken 10-horse engine tackle is £530; the interest and tear-a wear on which, for one year, at 15 per ce is £79, 10s. Divided by 100 days, 10 d more work being allowed in this ca (owing to the fact that the tackle is not liable to delays and hindrances by weather and awkward gates and fields), daily cost becomes 15s. 10d., to which, a 10s. for coal, 10s. for 4 attendants, 1s. for makes the total daily cost 36s. 10d., whi being divided by 9 acres, the daily average work, makes the cost per acre, 4s. $1\frac{1}{8}$d., or ab one-half less than the cost by the double s

The amount for coal for the single eng in the Fisken tackle, is put down at 10s., it is well known that the double engines c sume about 20 or 30 per cent. more coal t the single engine does. It is therefore dent, that the farmer, by the Fisken tac saves about £700 in first cost, and about 3 every working day, in comparison with first cost and working of a double set.

Should the farmer employ the plough engine for thrashing, there will be a grea advantage gained by having the single eng set; because, when the engine is emplo in thrashing, a far larger proportion of cost of the steam tackle is made use of, t although the farmer used one of the engi belonging to the double set and tackle. the one case, half of the cost, or more of ploughing tackle would be made availa while all that was required of the double tackle for thrashing purposes, would only be about the one-fifth of the cost of the tackle, viz., the cost of the engine power. The effect of this would be a considerable gain on the side of the single engine apparatus.

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[*] Continued from page 19.

However favourable the above comparison may appear, it could have been made still more so in favour of the Fisken tackle, from the consideration that the Fisken machinery is not so liable to serious breakage, the tear-and-wear is not so great on the engine and anchor windlasses, owing to the free and easy motion of the driving-band, neither are the double engines charged with the serious damage they do to the land, and their inability to enter any kind of field, and do any kind of work with economy. These items are susceptible of a money value, and would go far to reduce the cost per acre in favour of the Fisken tackle.

It will be seen that the double set is not credited with a greater amount of work per day than the single set. The report of the judges at Leicester shews that it was a single set which performed the greatest amount of work per day, or went over the greatest area; and if the work was not quite so deeply done in some instances, the greater depth could have been obtained by a trifle more coals, which would have increased the value per acre materially.

There is no reason why a single engine continuously working could not do more than two engines working alternately. The two engines have two fires to keep up all day, double the quantity of water to keep at the boiling point, and double the cooling surfaces exposed to the atmosphere, and, otherwise, double risks to encounter.

In the Inspection Committee's Report in the *Journal* of the Royal Agricultural Society, there is an elaborate comparison made in No. 91, endeavouring to shew the advantages of the double engine system over the single. Indeed, there appears running throughout that middle section of the Report, a tinge of favouritism for the double engines, and this bias comes more prominently out in the comparison referred to. Whatever truth that comparison may have in reference to the se there compared, it has none so far as th endless driving band system is concerne All the special pleadings and parings of tim manifest in the comparison, are dissipated b the actual practice of the Fisken tackle. Ta ing one week or month with another, there ca be no question but that the Fisken tackle wi do as much, if not more, than the double se The long delays caused by damp weathe the difficulty of entering into some fields, an the impossibility of working on others; th delays arising from the removing from fiel to field with the two ponderous engines, mor than absorb any little advantage claimed f the double engines facility in shifting. Gre delays often occur with the double engines i putting on or taking off the wheel spuds.

Mr Coleman, in the conclusion of th Inspection Committee's Report, page 42 remarks: "The difficulty on soft headlan and the delays that arise therefrom a serious obstacles with traction-engines," an he can suggest no remedy but the making roads along the field sides. See also "Fac for Farmers," pages 23-30.

All these points being taken into conside tion, there is no data or reason to shew th the Fisken tackle will not do as much wor per day as the double set; and if this wor as has been shewn, can be executed at ha the cost per acre, and with tackle not costin half as much as the double set, there is ce tainly a strong case made out in behalf the greater economy of the Fisken tackle.

The method of working field apparatus b means of a rapid driving band connecting with the engine power is destined to conf great benefit on the farmer in regard to th haulage of steam cultivating implement Speed as an element of economy is frequentl adopted in other mechanical arrangement Were it not for this element of speed, all th railways in the kingdom would have to mult ply their present number of carriages an waggons tenfold in order to accomplish th same amount of work. A carriage or waggo moving at the speed of 25 miles per ho does ten times more work in the way carriage than one moving at the speed of 2 miles per hour. Were it not for speed the economy of railways would be almost destroyed, at least at present charges; so also in many other things, speed is adopted for economy. This principle is largely illustrated by its adoption into the mechanical processes of nature; without it, for example, the flight of birds would be an impossibility.

The principle is introduced into the Fisken system to economize the haulage of steam cultivating implements. It has been found that a small rope with a comparatively light strain does not consume so much power in the conveying of a certain amount of draught to an implement as a slow moving rope with a heavy strain on it. The light strain, although the rope be moving at a high velocity, conduces to the durability of the rope. The quantity of acres which have been ploughed by means of the driving band acting on the windlasses in the field, has demonstrated most satisfactorily the durability of the rope, and consequent economy of this mode of transmitting power to considerable distances.

The history of rope haulage on railways also proves that ropes are profitable and durable in haulage. In the Fisken tackle, however, the rope is working more advantageously or durability than on railway inclines. The rope is completely borne off the ground and freed from all abrasion, being borne up safely by light friction sheaves; neither is the rope subject to damage by being wound on itself, but passes round the driving sheaves in a smooth groove.

The economy of conveying the power by means of a driving-band can also be fully established by a reference to other recorded experience. It has been found in railway practice that there is no excessive waste of power in hauling trains by means of ropes borne on friction sheaves, although the average distance of the train be above 1 mile from the motive power. Any one who examines the report of Walker & Rastrick on rope traction will see that the haulage in this way is much more economical than by locomotives, especially for short distances. If the working of such heavy ropes as are
required for railway traction could be pro
able, the advantages of the comparativ
light driving-band for steam cultivation
much greater. The strain on the Fisk
driving-band being but a small portion of t
strain on the plough, the weight required
the strength is comparatively small. T
rope is not only more easily borne up,
the friction in bending round pulleys is grea
lessened. These conditions are highly adva
tageous for the use of the driving-band
conveying power for agricultural purposes.

It has been proved by long practice t
the power necessary to move a rope runni
on friction pulleys, after the method used
the Fisken system, is about one-fiftieth p
of the rope's weight. This is the power
quired on railways, where the weight of ro
is great, and consequently stiff to bend.
the Fisken steam-tackle the rope is of sm
diameter, both light and pliable, so t
scarcely any allowance need be made for t
bending of the driving-rope round pulleys.

Supposing the average weight of the dr
ing rope for a 40-acre field to be 400 l
which, divided by 50, for the weight requir
to move it on friction-pulleys, gives 8 lb.

It has to be understood that the friction
the windlass sheaves, or the friction of t
engine, is not included in this weight
quired to move the rope, these are comm
to all kinds of tackle. A power that wou
propel a strain of 8 lb. at the rate of
miles per hour is the amount of friction c
sumed by the endless driving band. T
driving rope moving at 30 miles per hour
2640 feet per minute, which, multiplied b
lb., the strain to move the rope, gives 21,1
lbs. or not quite three-fourths of a hor
power. The cost of driving the endless ba
is, therefore, not great in comparison w
its many advantages. Were the cost of c
9d. per cwt., the amount of coal when burn
in a portable engine to supply this pow
would be about 4d. per day. So that althou
the friction of rope or loss of power was thr
or four times more than the above calculati
still the economy of the system would
established.

The cost of conveying the power by the endless band is so small that it is a matter of no moment, so far as loss of power is concerned, although the engine be a considerable distance from the field in which the tackle is at work. This is a great advantage, as it allows the engine to be placed where water may be obtained without cartage. If more power is required for the driving band than above indicated, it is a sign that the appliances are not all properly in order, or some latent defect exists, the bearing pulleys may either be too heavy for the rope or their bearings defective.

All the experience with the Fisken tackle has shewn, that the greatest distances at which the engine has been placed from the field, has not interfered with the economy of working.

The coals used have not been greater than for the same work done with other tackle. So far as reported, results can be relied on.

. It has to be noticed that the strain passing along the driving-rope, does not add to its weight; and that whatever be the distance of the engine from the field, the bends on the rope round corner pulleys always remain equal, or the driving-rope need never have more than 4 quarter circles above the driving sheaves on the windlasses.

The Fisken system has also many advantages over the one traction-engine plan, either with clip drum, or two winding drums.

The one traction-engine plan has still all the disadvantages of heavy engines moving on soft land and unsuitable fields. The greater cost of tackle in making the engine self-moving, all the drawbacks incident to the heavy cumbersome anchor, with its double strain. The unmanageable or unhandy slack gear, the difficulty of working in wet weather, the working of the double strain disc anchor, [illegible] found so great obstacles, that far[illegible] measure, ceased to purchase [illegible] anchor which requires gallows [illegible] lift it from or lower it to its travelling wheels, must, in every point of view, be an unsuitable field implement.

The judges at Leicester, indeed, report that the disc anchor for ingenuity, simplicity, and efficiency, still stands far a-head of every competitor. This anchor which called forth such an encomium is but an imperfect form of the Fisken self-moving anchor. The disc anchor has to resist twice the draught of the plough. It can only move when the plough is in motion, all which disadvantages are avoided by the Fisken perfect anchor. As the judges must have been comparing the disc anchor with the claw-anchor competitors, their encomium is perhaps true, and if such high praise be bestowed on the double strain anchor with its drawbacks, it will be difficult for these judges to find words to express their admiration of the Fisken perfect anchor when they have seen its working.

When the judges at Leicester state that the clip drum tackle compared favourably with the other systems, they attribute the result to the slack gear on the plough, but they take no notice of the additional strain put on all the working journals, nor the additional weight that has to be carried all day on the plough by this slack gear. They imagine the utilizing of the tail rope was the cause of the better result, but it is most likely that the real cause was the greater power of the engine. It has been found from railway practice, that whatever theory makes it, there is little aid derived from the tension of the tail rope.

The Fisken tackle has this advantage, if there be any, of utilizing the tail rope, as the endless band possesses it in perfection, being kept tight all round. The system also affords the ready means of taking advantage of the tail wire-rope strain, if its gain was worth the cost of the connecting-gear.

As the slack gear on the plough weighs about 600 lb., and as this weight has to be carried all day over soft land on the travelling-wheels of the plough, it is evident that the power necessary to do this is greater than what is required for the Fisken driving-rope.

The slack-gear and clip-drum system has been found to have so many serious drawbacks, that farmers have either been driven to give up the system, or to resort for a time to the costly use of two engines.

The two-drum and one-engine system has

all the difficulties attendant on the double-strain anchor, and, in addition, the almost unmanageable weight of the engine and its ponderous appendages, so that it is not likely that farmers will patronize the plan.

Farmers will find in the Fisken tackle a handiness, simplicity, and adaptability not found in these other plans. Its cheapness, both in first cost and working, and adaptability to all kinds of farms, will tend to promote steam cultivation, and enable most farmers to reap the advantages which the more thorough cultivation of the land by steam-power imparts.

The Fisken system is superior to the roundabout. The roundabout system, or stationary windlass, is sufficiently well known so as to render a description of it unnecessary. The roundabout system, even in the hands of the best manufacturers, is but the embodiment of a crude idea. The method of hauling a field implement backward and forward on the line of tillage by means of a long wire rope and stationary windlass, the rope being kept in position by a series of snatch-block pulleys and claw anchors, shews neither originality nor mechanical ingenuity, except of a low type; hence the many disadvantages inherent in the system which prevents it becoming an apparatus of general utility in steam cultivation. The roundabout system cannot conveniently take in large areas, and, for want of ample anchorage, is unfitted for deep and heavy tillage—one main object of steam tackle. Its cheapness in first cost has, however, caused many farmers to adopt it. This fact goes to shew how readily steam cultivating tackle would be employed if a system cheaper, more manageable, and serviceable than this cumbrous roundabout plan, could be produced. The Fisken system proffers to the farmer a system cheaper than the roundabout, and at the same time possessing an adaptability to the general purposes of tillage unequalled by any other existing plan of steam cultivation.

Supposing an intelligent farmer, well acquainted with the working of the best-made tackle on the roundabout sytem, were to enter a field where the Fisken tackle was at work, he would perceive the following points difference between the latter and the rou about. We shall suppose the Fisken tac working in a 40-acre field, in order to g a proper idea of the capabilities of system:—

The intelligent observer would at once that the Fisken system required fewer ha to work it than the roundabout.

The judges at Leicester state that manual attendants of the best roundab plan were seven. The reports of the Ins tion Committee shew that seven, and so times eight or nine hands are required this system, the number may be put dow seven, and sometimes eight. In the Fis system only four attendants are requi two of them may be lads. Mr Backho says that he has always wrought the Fis tackle with four hands.

The fewer manual attendants is a material point in favour of the Fisken p Manual attendants add considerably to cost of working any field apparatus: if attendants are numerous their wages are ning on at every stoppage of the tackle during delays incident to field operatio when the hands are few their wages, altho also running on at stoppages, bear a sma proportion to the work done, hence advantage of having as few attendants possible. The Fisken system saves at l the wages of three and sometimes four sons per day. This is certainly a p deserving a farmer's consideration.

But the observer would see somet more than the smaller number of attenda He would notice that the attendants on Fisken tackle had very easy work: any acquainted with the roundabout sys knows that all the attendants have, as it w to be on the stretch. The anchor men constantly and laboriously engaged in pul up and planting down their claw anchor each turn of the implement. The ploughm or man on the implement, has, over and ab the guidance of his implement, to watc he approaches the end, to be ready to rais flag at the proper time. The engineman, ag has to keep his eye on the field as well a his engine, in order to be able to catch the signal for the slowing and stoppage of his engine, and the porter boys have to run as it were at break-neck speed all day.

In the Fisken system the engineman has only to attend to his engine to keep it in working speed, the ploughman has no signals to raise or lower. The anchor windlass lads have only to clutch and unclutch the windlass at each turn of the implement, and, for the sake of a little exercise, may work the travelling porters when they are used. The ease with which the attendants can work a tackle forms an important element in its economy. When the men are not fatigued they can give more attention when required, and keep the machine longer at work. The Fisken tackle thus secures greater results to the master and greater rest to the men.

The third point on which the farmer's attention would be fixed, would be the comparatively small cost of rope by which the Fisken tackle takes in the whole 40-acre field. One rope of light material will be seen moving round the field at a high velocity, derived from the periphery of the fly-wheel of the engine, and acting on the windlasses, as it passes each on opposite headlands; another rope, the length of furrow only, made of steel-wire, attached to each windlass for the direct haulage of the implement; also two short ropes anchored a-head of each windlass for moving it forward at each turn of the implement. This arrangement of ropes will at once appear very different from the rope plan of the roundabout. The best roundabout plan could not take in the 40-acre field with less length of steel rope than 2250 yards, or thereabout, at the price of £6 per 100 yards, this rope alone [illegible] £135, or more [illegible] one required in the Fisken [illegible] length of rope, with its cost and [illegible] prevent the appli- [illegible] plan, to such a large [illegible] shifting of the tackle. To avoid [illegible] applicability of the roundabout for [illegible] areas, the plan of placing the engine in the centre of the field is resorted to, and the cultivation of the field is accomplished with [illegible] shiftings of the tackle; coals and water have then to be carted to the centre of the field, causing considerable damage to the land, and, after all, leaving a portion not operated on in the very centre; by this means, the field may be cultivated with less rope. The Fisken tackle would also cultivate the whole field with half the length of steel rope, and somewhat less driving-rope if the field was taken in two lengths, and very little shifting of the tackle would be required, while the engine would remain stationed in one place outside the field. In this way one-half of wire rope would be saved, as well as the carting of the water or coal to the middle of the field. So far as length and weight of rope are concerned, the Fisken system has decidedly the advantage over the roundabout. The roundabout must confine itself to small areas at one planting of the tackle, while the Fisken is as applicable to large as well as small areas. When it is stated in the catalogue of the principal maker of the roundabout system that 50 acres or thereabout have been taken in at one shifting, this must refer only to the engine, and that, also, to its being placed in the middle of the large field, as shewn by the woodcut in the catalogue, how much better is it to have the engine outside the field, and its whole cultivation done by continuous working of the tackle?

The observer, in prosecuting his inspection of the Fisken tackle, would discover that there is no stationary windlass standing beside the engine, but, instead, a single self-moving anchor windlass is placed on opposite headlands, in a line with the motion of the working or cultivating implement, and in watching the working of these windlasses by the attendants, he would observe that the motion of the implement is instantly arrested by the slight motion of the eccentric clutch, that the winding drum hauls the implement directly to it, and thereby avoids all bending of the wire rope round several snatch-block pulleys, not only doing injury to the rope, but causing a great loss of power by the whole plough strain passing round the pulleys. He would further notice that the anchor windlass with its broad culture and wheels has ample resistance to withstand the draught of the implement, and that this anchorage, with its winding drum, was easily and readily moved onwards by the attendant working the proper clutch. It will be seen that, by means of the anchor windlass and endless driving band, three valuable results are procured :—First, The main hauling drum is always kept in a line with the furrow or implement, so as to make the rope pull in a direct straight line ; secondly, that ample anchorage is secured for the heaviest draught in steam cultivation ; and, thirdly, this anchorage is easily moved the proper distance by the driving rope without scarcely any labour from the attendant. These three points are alone sufficient to establish the superiority of the Fisken tackle over the roundabout, with its indirect pull, imperfect anchorage, and constant toil in shifting them.

The next feature which would engage the attention of an observer would be the few bearing pulleys required for the driving band, and the comparatively slight fixtures or anchor pulleys for the corners. These advantages are the result of the rope moving at a quick speed. If there be only about the fifteenth part of the strain of the plough on the driving band, it is self-evident that a rope capable of bearing this strain may be fifteen times lighter than the main hauling rope, and also the anchor bearings at the corners fifteen times lighter than if the whole strain required to pull the plough was passing round them. Every one knows that the bearing pulleys of the roundabout plan have to be numerous, and the corner snatch blocks so rigidly fixed as to resist the strain necessary to pull the plough. If the rope of the roundabout plan makes a quarter turn round any of these corner pulleys, they must be made and fixed so that they may resist seven-fourths of the plough draught. Such heavy fixtures encumber the working of the plan.

The observer would be able to note further, as points of superiority and advantage over the roundabout, that as the engine is kept continuously running, and not stopping at each turn, there is no great use for encumbe ing its cost with double cylinders, that the i plement can either work *to* or *from* the engin while the roundabout can only work *to* t engine, that is, the claw anchors must alwa be shifted onwards towards the engine. Th the implement does not require to slacken pace as it approaches the anchor windlass headland ; that the stoppage and reversing the motion of the implement are effected most simultaneously or without any great l of time.

These are some of the advantageous featu of the Fisken tackle which the observer wo not fail to see, and when they are all put gether and properly weighed, they lead to t inevitable conclusion that this improved s tem of steam cultivation can be made at l cost than any tackle on the roundab method, and that it can be wrought w greater ease, with much less cost, and, at same time, more applicable to the vari operations of husbandry than the roundabo The immense extent of area or number fields which can be cultivated by the Fisk tackle renders the carting of water in n cases out of ten unnecessary. The sav effected on the engine, in the wire rope, snatch blocks, and heavy pulleys, will ena a set of tackle on the Fisken plan to be p duced for about £450, which would surp in efficiency a set of the roundabout, cost £520.

These statements of comparison are s cient to shew that the farmers of the Uni Kingdom have yet before them, and await their patronage, arrangements and impro ments in steam tackle superior to any those systems with which they are alre familiar.

It is worthy of notice that in the Fis system the quantity of rope required different areas does not vary in proportio the extent of area. The rope necessar take in a 10-acre field is not increased f fold for a 40-acre one ; only twice the qu tity or length is required for a 40-acre wh a 10-acre field requires. This shews the Fisken tackle is well adapted to the tivation of large fields, as well as small. The larger the field the less rope per acre is employed.

If the Fisken system is fitted to cultivate with economy a 40-acre field, without a removal of the engine or shifting of the tackle, it is evident that two or three hundred acres extent of land may be readily cultivated by the engine remaining all the time in one place. Such a result saves the daily cost of carting water and coals into and over fields.

There is no saying, when farmers become familiarized with this improved mode of the transmission of power to field operations, what extent of land may be cultivated by one central power. It would put the system to no great strain although some farms of considerable extent were cultivated with one central-stationed power; and no doubt this will be attempted as soon as farmers see that stationary engines can furnish power at lower cost than either portable or traction engines; but until steam boilers for stationary engines can be made stronger, and within less compass, and more readily fixed, it is not likely that the portable or traction engines will be superseded for tillage purposes.

THE ADVANTAGES OF THE FISKEN TACKLE FOR HIRING.

Abundance of power in a hiring set of tackle is a chief element of success and economy. The reason why travelling steam thrashers so rapidly supersede other modes of preparing the grain for market, is owing, in a great measure, to the greater power brought to bear on the work, so as greatly to facilitate its performance. The power which a [illegible] horse steam engine can so con[illegible] [illegible] [illegible] [illegible] [illegible] [illegible] steam ploughing [illegible] employ[illegible] would require to be made more powerful than the horse power they are designed to supersede. The great objection to the double-engine system is the heavy investment necessary to procure ample power, and this cost i greatly enhanced by the farmer being compelled to have two engines to do the work o one. A full set of two 14-horse powe engines and tackle, fitted for hire, is stated b an eminent manufacturer to cost £1800. I must be a very heavy drag on the profits o such an instrument to have always one o these costly engines standing idle while the other is at work. Scarcely any other manufacturer could compete successfully with his neighbours in any branch of industry if he had to maintain two costly engines in working order simply to do the work which one o these engines was able for; such odds would in most cases be destructive of all profit. I cannot be expected that the employment o two engines to do the work of one can long remain a profitable mode of steam culture.

What is wanted is a tackle with one engine of ample power, to do as much work per day as any double set has hitherto done, and something more if possible.

The roundabout system is almost prevented from being good for hiring, from the impossibility of such tackle being able to apply great power, or take in at once large fields. The claw anchors become unwieldy when made to resist the strains of powerfu engines, and the bending of strong ropes round the many snatch-block pulleys required entails a great waste of rope, and a grea amount of power in the numerous bendings o the rope, besides the wages of so many attendants required to manage it. The clip drum, with its cumbrous double strain anchor has been found to be too unmanageable for hiring purposes.

The Fisken tackle, on the other hand, can apply the power of the strongest engines used in tillage. The convenient travelling anchor windlasses of this system not only secure ample anchorage for great strains or pulls o the implement, but are very manageable, and easily shifted from place to place. A traction-engine and tackle, on the Fisken plan gives nearly all the advantages in shifting attributed to the double engines, and greater advantages in other respects, with regard to the economy of power.

For the sake of illustration, I shall take the case of the Fisken tackle, with one 15-horse power traction-engine and suitable tackle, and compare their results in working and cost, with two 10-horse power engines and tackle. The two tens and tackle will cost £1320, and the Fisken tackle and 15-horse power traction-engine £800. That is, the latter tackle is £520 cheaper, and has, besides, 5 nominal horse power in addition; or the one tackle would have at work at one time only 10-horse, the other (Fisken) 15 nominal horse power at work, without any more additional hands. Look at the effect of this upon a day's work. Suppose, for the sake of illustration, that the Fisken tackle wrought only 9 hours per day: that would be equal to 135 hours of 1 nominal horse-power, or 135-horse power working one hour per day. Supposing the two tens wrought ten hours per day, and as only one engine is at work at a time, that would be equal to 100 hours of 1-horse power per day, or 100 horses one hour per day. In this case, the Fisken tackle, costing only £800, and working only nine hours per day, would have 35 hours of 1-horse power more work per day than the two tens costing £1320, and working ten hours per day; or, in other words, supposing each engine of equal power and efficiency in proportion to the stated nominal horse power, and that 10 nominal horse power cultivates about 1 acre per hour, a performance often realized, then the two tens, working ten hours, would cultivate 10 acres per day; while the 15-horse power engine would cultivate 13½ acres per day, working only nine hours, allowing one hour each day for shifting or casual delays: and this result is obtained with fewer hands, and with tackle costing £520 less money. These considerations shew decidedly the advantages of the endless driving-rope tackle for hiring purposes.

The one cultivates 81 acres, and the other 60 per week, at 10s. per acre. The cheaper tackle realizes £10, 10s. more per week than the more costly, and saves about half the outlay of the other. This, however, is placing the two tens in rather advantageous light, because it does not follow that the Fisken tackle will work shorter hours per day at a average. The Fisken tackle can work man a day when the double engines cannot, an is not exposed to delay, entering and remo ing from fields, as the two engines often ar Then the Fisken tackle, by the addition of second driving rope, corner and bearin pulleys, costing in all under £30, may b wrought with as little delay in shifting as th double engines. Then, again, the Fiske tackle would often be able to cultivate sever fields from one point, when the fields are n very large, so that an additional saving woul be made by this tackle from the absence water carting.

Were the hirer to have only a 10-hor power traction-engine and Fisken tackle, the would be nearly the same amount of wo with tackle at half the cost; but as sma tackle takes as many hands as large tackle, will always be found most economical to ha plenty of engine power.

When Boulton, the celebrated manufactur of steam engines, and partner of the great i ventor James Watt, was introduced to t Sovereign of the day, he answered, in reply his Majesty, as to his trade, that he dealt what kings greatly delighted to possess, vi power. All owners of steam tackle, li kings, should be covetous of power; but it one of the strange mechanical absurdities co nected with steam cultivation, that farme should buy steam tackle which compels the to have one-half of this precious power star ing idle while the other half is at work.

In my Prize Essay, to which £25 w awarded by the Bath and West of Engla Society, I pointed out more fully the adva tages of abundant power in the engine, that the work done might bear a large p portion to the manual attendants. I urged t point, also, on some of the manufacturers steam tackle, and that one has been m successful who took the advice, and ma the ploughing engines of greater power efficiency, although still of the same nomi power.

Sufficient has been stated to shew farm that the Fisken tackle, as a hiring apparat is unsurpassed by any other system.

When the double set is recommended for its facilities in shifting, it is generally kept out of view that this system requires a man and horse and water-cart to attend all day, in carrying water and coal, equal to ten men and ten horses, for one hour each day, more than would shift any set of tackle with only a portable engine. The small gain in shifting is more than lost by additional water and coal carting.

The Fisken tackle is admirably adapted for export to foreign countries, where there is a difficulty in executing repairs. In this system the engine is not only single, but of the simplest construction, not exposed to the wrenching effects of having the winding gear attached to it, and is, therefore, capable of greater durability and freedom from breakage. The tackle, also, is so plain and simple, that there is no country into which steam culture is likely to be introduced but what could furnish the ready means of repair or replacement. When the cost and intricate construction of the double engine are considered, and how that in working them, there have to be performed so many critical acts of clutching at each turn of the implement, and that such heavy and costly pieces of machinery have to be knocked about on awkward farm roads and soft field headlands, one is led to wonder by what process of ratiocination the judges at Leicester recommended the double engines as suitable to foreigners. Mr Howard Reed, in summing up the evidence recorded in one section of the Committee's Report on steam cultivation, observes, page 196, "The greatest injury done to engines is not in ploughing, but in shifting; the rapid reversing, so often most carelessly done, is that which most tries an engine." British farmers were hardly the persons to know what was best adapted to Pashas and foreign princes. Foreigners will not readily accept the guidance of such a hastily formed opinion, even although gilded with judicial authority. From their circumstances they are accustomed to examine more carefully the economical bearings of all mechanical processes than many British farmers; and when these foreigners come to know that steam tackle possessing greater mechanical advantages may be got on more reasonabl terms, they will not be slow to adopt it.

WHAT THE OWNERS OF DOUBLE ENGINES AN ROUNDABOUT TACKLE COULD DO WIT ADVANTAGE.

The owners of double engine sets, by attaching the Fisken tackle to each of thei engines, would enable them to do twice a much work, or if they had not employmen for two such sets of tackle, one of them coul be sold, as the remaining engine, with th Fisken tackle, would be as efficient as th double set of engines. Any engine is adapte for working the Fisken tackle, by simpl having a driving grooved rim attached to the fly-wheel.

Those who have a roundabout set woul increase the efficiency of their engine powe by the adoption of the Fisken method. Th change from the one system to the othe could be effected with little cost. The tackl would not only be easier for the men to work but it could be wrought at much less cost pe day, while the heaviest kind of work woul be performed with the improved tackle. I any object to the driving rope as being deficient either in strength or durability, the objection is fully met by the fact, that the driving rope is about twenty times stronge than the working strain; so that there is in reality far more strength in the driving band for its work than any other part of the machinery. Owing to its length its durability is greater than ordinary driving bands of less length. The pliancy, efficiency, and handiness of the endless driving band impart great adaptability to the system.

ADVANTAGES OF STEAM CULTIVATION.

The advantages of steam cultivation are both certain and valuable. The main sources of advantage are the deeper and more thorough pulverization of the soil, the cultivation being done in the most favourable season, and by giving the farmer the means of bringing all his arable land under crop every year without the necessity of bare fallow. Another advantage arises from the fact that steam cultivation is cheaper than horse labour. If the seasonable and more perfect culture effected by steam power causes an increase of produce at less cost for labour, there must evidently accrue to the farmer a real and substantial benefit from the employment of steam cultivating tackle. The farmer may, in a general way, count upon a few bushels more per acre of grain from the effects of the steam tackle, while the cost of cultivation by steam need not much exceed, if it may reach, the price of one of those additional bushels. By the powerful agency of steam there is nothing to prevent a farmer having his fields in as thorough a state of open, loose, and clean tilth as well-dressed garden plots. A larger crop, and more produce from the same extent of land, are more profitable to the farmer than this increase gathered from a greater breadth; so that the farmer, by the use of steam tackle, virtually adds to the extent of his farm by increasing its resources.

WHY STEAM CULTIVATION IS SO SLOWLY ADOPTED.

So long as at present the chief awards of national agricultural societies are given to apparatus in which the nominal horse power of the tackle costs about £130, the annual tear-and-wear and interest of which are more than a horse's keep for the time the tackle is at work, and where every acre cultivated has almost a man's daily wages lying against it, there cannot, by any possibility, be very rapid or great extension of steam culture. Farmers, at present, however small their occupations, are able to maintain horse power within themselves to perform all the operations of tillage, and do many other things besides, and they cannot be expected to part with their horse power for costly machines of doubtful economy. Costly machines, even although able for a great amount of work, are not always the most serviceable and profitable to farmers. The Royal Agricultural Society gave their award at one time to the powerful and expeditious Crosskill or Bell's reaper; farmers, however, did not follow that award, but quickly adopted the less costly and less effective smaller reaper, because they found it more serviceable for harvest operations. Something of the same course is likely to be followed by farmers the matter of steam cultivation. The g desideratum of the farmer is a set of tac sufficient for his tillage operations, and wit the reach of his purse.

A steam horse-power can be produced a kept at but a fraction of the cost of a m horse; and all that the farmer wants is a cheaper power yoked to the plough with the advantage being swallowed up in the c of its harness or attendants.

The Fisken tackle is designed so far remove the obstacle of cost, and to ena every farmer of moderate occupations possess his own tackle, and also to work at much less cost than any other set.

Farmers are, no doubt, like many oth slow to give up antient customs and hal for novel and untried plans, even althou the new may have advantages over the o but there can be no doubt that the prejud for steam-traction will be given up by c tivators of the soil as soon as they see t steam power out-rivals in economy their c and faithful friend the horse. One wo have thought that, to the extensive and lab ous work of tillage, farmers would have be the first and most ready to have applied great and untiring agency of steam; and c tainly no proper reason can be given why steam power has been found profitable, a is so extensively employed in the lighter w of thrashing, where only a weight of 2 or tons per acre is manipulated, it should n have had its powerful arm brought to bear the cultivation of the soil, which requires t stirring or mixing of about 1000 tons p acre. The amount of traction required tillage appears at first sight a very tempti field for the more economical agency of stea and there can be no doubt that, sooner later, the chief part of field operations will performed by the more powerful and untiri steam engine. Experience has shewn th the extension of steam cultivation is n prevented by either mechanical or econ mical obstacles. As a certain amou of power is necessary in every set of tack to render its use profitable, it will follow th those farms which can employ the larger s of tackle can with more certainty render them economical. There is no reason why agriculture should not share in the advantages of steam power as well as other industries. There are about 8000 locomotives employed in haulage on the railways of the United Kingdom, and each of these engines, at an average, runs about 18,000 miles per annum; so that their united power would do more than plough twice over all the arable land of Great Britain and Ireland. This immense power employed in the carrying trade of the nation is not of a very productive character; but were a share of such power employed in the operations of husbandry, it would not only be certain in profitable returns, but promote a rapid extension of national wealth. It would be an interesting problem for pol tical economists to solve how the railwa interest has secured such an amount of cap tal, while the more certain wealth-producin interest of agriculture has failed to share a much in the developing power of money. Th efficient economical appliances of the Fiske system of steam cultivation, and its grea adaptability to the general purposes of tillage will perhaps help to draw forth capital, an more rapidly develop the agricultural interests of the empire.

[The conclusion in our next.]

THE ADULTERATION OF SEEDS.

PROSPECTS OF LEGISLATION—PROGRESS OF THE BILL—DEPUTATION TO MR BRIGHT—THE DEBATE ON THE SECOND READING.

At the eleventh hour some semblance of opposition crops up on the question of legislating to secure honest dealing in the wholesale and retail trade of seeds. A few of the more distinguished of the trade who have been maintaining either a dignified, or rather we should say, a becoming silence, step forth, fully armed with the intention of defeating, or at all events strangling a Bill which has met with uncommon popular support. Had they taken the initiative when the reports of the Royal Horticultural were published, impugning the character of the wholesale trade of London and shewing up the questionable vitality of their goods, we might have been inclined to sympathize with them. Silence in the matter [illegible] commercial scandal of having [illegible] [illegible] or [illegible] dissatisfaction was fomenting [illegible] of those more immediately concerned it ought to have come to "a head," and taken effect not only in an immediate protest against the partial character of the trials, but some evidence ough to have been led to counteract a report o reports which were sure to have a banefu effect upon the great buying public.

But what was the fact, if the broad statements and direct insinuations as to commer cial dishonesty took the public by surprise, i evidently also paralyzed those more immediately impugned—nay, some of them declared the truth had been only partially told and set about in search of a remedy, whicl was found in the Seed Adulteration Bill, the principle of which has certainly now beer affirmed, but is to be dealt with by a Selec Committee. All, certainly, did not banc together in seeking for the direct interferenc [illegible] the Legislature; but the trade, or at al [illegible] such of them as now figure promi [illegible] in opposition, stood aloof and saic [illegible] because little could be said toward [illegible] them from the charge of a prac [illegible] had insidiously crept into the gene [illegible] dealing of seeds, and from which house [illegible] London, turning to the per-centages o [illegible] published by the investigating jury, wa wholly exempt. We are not concerned in regarding the position of those who took, or those who did not take the initiative in the drawing out of this Bill. We are concerned in the interests, not only of the great body of our readers, but on principles of commercial morality, in insisting that a glaring practice of this kind should be rectified, and that too with despatch. Addison says truly, that "A man's first care should be to avoid the reproaches of his own heart; his next to escape the censures of the world." Some seedsmen, undoubtedly, have little to prick their conscience, because they have all along acted as near as possible on a principle of rectitude; but if they wish at this time to escape the censure of the world, they must not step in with whitewashed countenances, and refuse that the filth of the dealing of their class should not be purged towards cleanness.

Even Mr Bright, who had fortified himself with multitudinous details, *pro* and *con*, was compelled to admit that there was a grievance to deal with of considerable magnitude. He could not, however, see his way to accepting the Bill as it stood, evidently scared by the representations coming from malcontents; and in his desire to do justice to all, recommended the clauses to be reconsidered by a Select Committee. There can be no objection to this mode of dealing with the Bill; only let it be understood that the matter is not shelved for the session. The prolonging of a discussion that ought to be settled by a jury of twelve competent men in so many hours, will be looked upon by the public as not only indiscreet, but unnecessary, seeing that the evil is admitted on all hands, and that the remedy involves no hardship to any one but those that are roguishly inclined and caught in the act.

It will be impossible, as we before said in a previous article on this subject, to reach all cases of fraud, such, for example, as the trafficing with seeds of long standing, that fluctuate in periods of germination, as well as in point of vitality; but there will be little difficulty in detecting doctored seeds, and as little in inflicting condign punishment on the offenders. We look upon the detecting and dealing with counterfeited seeds and those who traffic in them (these six or eight manufactories, in particular, exclusively devoted to doctoring seed, alluded to by Mr Welby in moving t second reading), as one of the germane poir of the Bill; and if nothing else was legislat upon than this, it would be a direct gain. is a piece of nonsense for "one of the mc extensive seedsmen of the kingdom to advi the President of the Board of Trade that leg lation on the question was unnecessary, that effect would be to bring several thousan of persons into peril, and that the hon would suffer with the dishonest." This cou only be the case with the inefficient trad man, who did not take the trouble to mas the details of the trade. Buyers of seeds a provided with uncommonly good eyes, a detect imposition as to mixtures at a glan They may not be competent—and on t we sympathize with the trade generally to detect killed seeds readily, but the fe of the lash of the law would exercise inconsiderable influence upon the base kill of an inferior article, and rectification wo be the order of the day. Moreover, go houses deal with houses of a correspondi character, and either of them in turn s that their goods are selected from the b of seed farms; we are therefore totally u able to see how they would be seriou affected by the passing of this measure in the law of the land. Some maintain that will require the cleverest experts to det trefoil, for example, after it has be dyed and doctored, among red clover, a that the majority of the trade, especially retailers, might be duped so as innocently palm it off as the best article to their custome and thus lay themselves open to the penalt imposed. The only answer to this is t the tyro must improve his education, as it c hardly be expected that the public are suffer for the shortcomings of any deal But the latter ought always to have t loophole of escape in cases of doubt, wh serving his customer, by declaring that he cou not and would not guarantee the article first quality. His business might be affect by an admission of this sort, but h honesty could not be traduced, and seve practical trials in the "warm and mo flannel" principle recommended by t

Royal Horticultural, would give him an idea of per-centages that would germinate. It is clear to every one that the best article as near 100 per cent. germinating power *ought* to be produced, *can* be produced, and, shall we say, *is*, in some solitary cases, produced on demand; and that the only way to uphold and maintain righteous dealing is to sample the unrighteous dealer himself.

Several members of the House have been and will be advised that all ought to be satisfied with the ventilation of the subject and the discussion consequent upon it. That the evils complained of are diminishing, that those manufactories so much aimed at have to dispose of their killed and dyed seeds in some other way than for destroying the quality of a genuine stock, and that the traditional custom of mixing, handed down as an heirloom of the trader in seeds, will be virtually abolished. There may be a temporary lull of the malpractices in question, owing to so much discussion, but how long would it last after Parliament had declared itself unable to cope with the questions. Farmers and dealers, in general, of the smaller class locally might really be worse served than they were before, as a certain confidence would be established in the minds of tricksters and defaulters, and their game would be persevered with to its extreme limits. On all hands, therefore, it is desirable that the main points of the Bill should be passed this session. To shelve all the Bills introduced this session for the correction of agricultural grievances, would shew rather an indifference or indisposition on the part of our legislators which would be censurable in [illegible] extreme.

[illegible] deputations that ap- [illegible] support [illegible] Bill have sufficiently [illegible] cause [illegible] it is a [illegible] them the [illegible] the investigation [illegible] represented. To [illegible] important investigation, and, [illegible] the apathy or indifference that has not been sufficiently explained, abstain from following up the natural sequence by correction in the shape of giving active support to a measure founded mainly on their observ tions and deductions, is inexplicable. Inactio of this kind coming from that quarter is ap to be misconstrued, and we are curious t know, in the interests of the public, why child begot mainly under their auspices should be "left out in the cold?"

PROGRESS OF THE BILL.

Since the publication of our last num ber, the Bill has been read a secon time, and referred to a Select Committee It was generally understood from the coo reception which the Bill received fron Mr Bright, that he would oppose the secon reading, and, in consequence, the Promoter determined to organize a deputation to wai upon the right hon. gentleman at the Boar of Trade, to explain its provisions, and re quest his support.

DEPUTATION TO MR BRIGHT.

In accordance with this resolution, a larg and influential deputation was constitutec and on Thursday, the 10th inst., the intervie took place. The deputation was introduce by the Right Hon. Henry Brand, M.P. Th Chambers of Agriculture were represente by Mr W. E. Welby, M.P., and Mr C Sewell Read, M.P.; the Royal Agricultur Society of England, by Mr Dent, M.P member of the Council; the Royal Dubli Society, by Alderman Mackey, Dublin; th Royal Agricultural Society of Ireland, b Mr Purdon; the Royal Horticultural Societ of Ireland, by Mr John Farrell, of the fir of Fergus Farrell & Sons, Dublin; the Pro moters of the Bill, by Mr Charles Sharpe, o the firm of Charles Sharpe & Co., Sleaford the wholesale houses of London, by Mr Wm Hurst, of the firm of Hurst & Son, 6 Leaden hall Street, and Mr Kennedy, of the firm o Thornton, Kennedy & Hey, 2 St Thoma Street, Borough; the country seed trade, ac companied by Charles Seely, Esq., M.P., b Mr M. Sutton, of the firm of Sutton & Sons Reading, and Mr A. Dickson, of the firm o F. & A. Dickson & Sons, Chester; th wholesale seed trade of Ireland, by M G. I. Alexander, Dublin; the retail see trade of Ireland, accompanied by M

Pim, M.P., Mr Sherlock, M.P., and Mr Jas. Roberstson, of the firm of Hogg & Robertson, Dublin; the wholesale seed trade of Scotland, by Mr R. Edgar, Edinburgh ; the retail seed trade of Scotland, by Mr W. Mein, of the firm of Stuart & Mein, Kelso; growers of seeds, Mr James Watts, Hythe, Kent, and Mr Henry Sharpe, Leverington, Wisbech, Cambridgeshire. The public interest was represented by Dr Masters of *The Gardener's Chronicle*, Mr Edward Ravenscroft of *The Farmer*, and Mr Edward Purdon of *The Irish Farmers' Gazette.* The agricultural interest was further supported by Mr M'Combie, M.P., Mr Charles Bramley, and Mr Rich Young, late M.P. for Cambridgeshire. Earl Grosvenor, M.P, likewise accompanied the deputation. The Royal Horticultural Society, as already mentioned, was not represented, and its absence is to be regretted, as the Society was the first to attempt to put a stop to the practices complained of. The absence from London of those members who have taken the most active part in the matter was alleged as the cause of no representative being present.

The following statement was read by Mr Sharpe of Sleaford, one of the Promoters, and it, as well as the clauses of the proposed Bill, were discussed by Mr Bright and the members present :—

"The system of adulterating seeds, which the Bill is intended to remove, exists at the present time on a large scale; it has increased and is increasing with the intensity of competition in the seed trade. The grievances which have long been complained of are these :—Large quantities of Rubsen or German rapeseed and inferior samples of English rapeseed are killed, by a process of steaming and kiln-drying, for the purpose of mixing with English-grown turnip-seed; seeds of the cheaper kinds of Brassicas are prepared in a like manner for adulterating the seeds of those varieties which have a higher value. Trefoil, a cheap and inferior kind of clover, is killed and dyed for mixing with red clover and cow-grass; and inferior old samples of clover seeds are coloured and dyed for the adulteration of seeds of a higher value—this process of killing and dyeing generally destroying to a great extent the germinating power of the seed so treated. There are other cases which might be mentioned, but these constitute the principal evils.

"Now, to carry out this system of adulteration there exist in London and other places manufactories for the preparation of seed for adulteration, their sole business being to kill and colour seed for the use the trade.

"The Bill proposes to inflict a penalty upon person engaged in this business of preparing seed adulteration, and it is anticipated that this clause al will do much to prevent the practices complained Penalties are also imposed upon the persons sel adulterated seeds. Further than this, the Bill c not propose to go. It does not deal with admixt of seeds which have been kept too long, or which simply of an inferior description, as the seeds of we for in neither of these cases is the presence of bad s necessarily the result of intentional fraud, at wh alone this Bill is directed ; the rest may fairly be between the dealers and the consumers, without m fear of injustice to the public.

"The passing of this Bill must be for the pu good ; the adulteration is a direct fraud upon the c sumers, who are unable of themselves to detect it : t expect a genuine article and obtain a spurious one : reason of adulteration, more seed is required, and consumer increasing the quantity of seed he so hoping thus to secure a better crop, only leaves opening for the dealer to increase the proportion killed seed. A portion of the seed committed to ground being silent and without result, it must considered as a dead loss to the consumer, whose mo is withdrawn from him by false representation. case of disappointment and failure of crop, proof t it has been caused by tampering with the seed is cessarily difficult, and the remedy at present provi by law is so tedious and expensive, that even in ca where distinct proof of fraud could be adduced victim often prefers to put up with his first loss silence.

"The Bill must also prove advantageous to grower of seeds, because in case of bad seasons a short crops, he is prevented from realising a remune tive profit in consequence of the quantity be increased by an extra infusion of killed seed ; an may be stated that when seeds are expected to be de from the crop being known to be a failure, there often a heavier stock left over than in more plent seasons.

"The seed dealers throughout the three kingdo (so far as the promoters have been able to ascerta are unanimous in support of the Bill, because they be freed from a system which they know to be dishone and which entails considerable trouble, annoyance, a responsibility—a system bequeathed to them by tra tional custom, and which is so thoroughly rooted the trade, that the frequent attempts which they h made to rid themselves of it have failed, and they n feel it necessary that their hands should be strengther by the present Bill, to enable them to eradicate a pr tice which is indefensible on any grounds. Espec care has been taken by the proviso in the 6th clau that the operations of the Bill shall not be wider th they profess to be, and that no legitimate operation trade shall be in the smallest degree interfered wi

The honest trader who sends out genuine seeds, is unable to compete with the seller of adulterated seeds, because the great body of purchasers are men who are unable to discriminate between adulterated and unadulterated seed.

"We trust that we have now shewn that all the interests concerned—the public or consumers, the grower and the dealer, and the various Royal societies, except such as are prevented by their charter, but represented in this room—are unanimous in favour of the Bill becoming law. A copy has been sent to every known dealer throughout the kingdom, also to the public press, and not a single adverse criticism has been made upon the principle of the Bill, or an objection raised to it."

A discussion followed the reading of this paper, but as Mr Bright specially requested that the opinions expressed by him should not be published, we refrain from saying anything of what took place. Our readers are therefore referred to a revised report of the hon. gentleman's speech in the House on the second reading of the Bill, which we report *verbatim.*

THE DEBATE IN THE HOUSE.

The gallery of the House of Commons presented, what a friend at our elbow was pleased to call a "bucolic" look, when, on Wednesday the 16th, Mr Welby rose to move the second reading of the Bill to Prevent the Adulteration of Seeds. The Seed Trade was well represented on the occasion, several country members of the deputation who had waited on Mr Bright on the previous Thursday having remained specially in town to hear the debate, which was as follows :—

ADULTERATION OF SEEDS BILL.

Mr Welby, in moving the second reading of the Bill, after dwelling on some points which he considered rendered legislation necessary, proceeded to say hat his statements reflected on Seedsmen as a class, ut there were many honourable exceptions; and, in act, the Bill owed its origin to a very strong desire on he part of the more respectable Seedsmen to abolish the [illegible]ices which were a scandal to the trade. The farmer of an arable farm was greatly dependant upon purchased eed, particularly of the kinds in respect of which he was most likely to be imposed upon, and of which he had the east knowledge. Constantly in the habit of handling amples of corn and of observing it in all its stages of rowth, the farmer became as good a judge of it as any professional man ; but with smaller seeds, the variety of which was infinite, while the resemblance was very close, he was almost entirely at the mercy of Seedsmen ; and his was true of the small farmer very much more than of he large farme[illegible] the latter could deal with Seedsmen of [illegible]ablisher [illegible] the small farmer was obliged to go to retailers in the neighbourhood, or to those wh would give him credit. It might be taken as an establishe fact that 90 per cent. of well-preserved new seed woul germinate, and that only 60 or 70 per cent. of marke seed was capable of germinating. Ten years ago a serie of experiments were made by Professor Buckland, and o ten picked samples of turnip seeds 92 per cent. germinated while of ten market samples only 68 per cent. came up The results of experiments with samples obtained fro nearly all wholesale dealers were as follows :—Of whit turnip seed 74 per cent. came up ; of yellow turnip see 66 per cent. did ; of cauliflower and brocoli 51 per cent. and of carrots less than 40 per cent. It came to this, tha at least one-third of the seed sold to farmers was worthles rubbish ; and this was shewn indirectly by the fac that a farmer would usually sow one-third less of see which was of his own growing. One of the complaint against the seed trade, then, was, that a great dea of seed that was sold would not germinate ; an another was that a great deal of seed was not what i was represented to be. With genuine seeds were mixe spurious sorts, sometimes mere weeds, which so close resembled the more valuable sorts as to be undistinguish able from them by the ordinary purchaser. In cases i which the resemblance was natural, or in which the see had lost its vitality naturally, the Bill did not interfer He had been strongly urged to deal with these cases, bu the vitality of plants varied so much that he had bee unable to meet the difficulty. If a form of words coul be devised that would meet it, he should be happy t assent to their introduction. The object of the Bill wa to suppress practices which were beyond denial, an which, beyond contradiction, were wilful and fraudulen The practices were the killing of inferior sorts of seed which bore a close resemblance to the better sorts, simpl on the principle that "dead men tell no tales," in orde that they might be mixed with the better seeds, and th doctoring and colouring of seeds to produce the lik resemblance. It had become notorious that these prac tices constituted a separate and distinct branch of th trade. He believed there were six or eight manufactorie exclusively devoted to doctoring seed, and seed so tam pered with was well known and recognized in the trad The hon. member quoted a circular with reference to new and improved method of killing seed, and he the referred to a letter in the *Times* of March 15 (quoted i No. 1 of *The Seedsman*, page 11), remarking that th only reply it produced was that any one could have goo seed who would pay for it. Legislation was necessar because adulteration had become a traditional custom the trade, and purchasers were not sufficiently enlightene to discriminate, so that dealers who stood out against th custom would ruin themselves without conferring an corresponding advantage on the public. Any chang must be compulsory, and of universal application, an that made the members of the trade the most active an warm supporters of the Bill. The present legal remed against these practices, viz., a civil action—was tediou expensive, and practically unavailable, and it was b lieved that summary conviction would be more effectiv On this point he read a circular from a person engaged the preparation of seed, containing admissions which cre ted some laughter. He was told that a person, by simp cutting a seed in two, could tell whether it had been steame or not, but experienced dealers could hardly distinguish t steamed seed at sight. He would, of course, be rea to receive amendments, but believed the 6th section of the Bill was so widely drawn that it would not hinder any legitimate operations resembling the adulteration he sought to suppress. He concluded by moving the second reading of the Bill.

Mr **Collins** hoped the Bill would be read a second time, but, inasmuch as the subject was entirely new to Parliament, recommended that the Bill be sent to a Select Committee, that the House might be informed as to the facts of the case. He understood that kiln-dried seed was used for food, and there might be other cases in which processes, illegitimate if used for fraud, would be perfectly legitimate if designed and executed for an innocent purpose. A Select Committee would be able to furnish the House with evidence upon such points, and prevent Parliamentary condemnation of perfectly legitimate processes.

Mr **Shaw Lefevre** said it was impossible to deny that the evils the hon. member hoped to put an end to by his Bill were of a very serious character, demanding legislation of some sort. It was difficult to say how the custom of mixing seed arose; probably it commenced by the not altogether reprehensible practice of mixing old with new seed, which the fraudulent had followed up by adulterating genuine seed with kilned. Endorsing the proposal to send the Bill to a Select Committee, in order that the facts might be substantiated before legislation, he observed that the Horticultural Society had expressed the opinion that the public was often deceived by the practice, arising from ignorance as often as from dishonesty, of keeping seeds until their germinating power was destroyed by age; and the same society passed a minute only yesterday approving the principle of the Bill, but remarking that it did not go far enough, because it did not take sufficient precautions against the sale of seeds which had died a natural death. The true cause of all this fraud was the gradual lowering of the standard of seeds, and the remedy was to be found in some process of raising the standard, as had been done by the Highland and Agricultural Society with respect to manures. This society had adopted the practice of testing the manures and rejecting what was adulterated with satisfactory result; he therefore recommended some similar process to check the adulteration of seed in preference to the adoption of criminal proceedings, the expediency of which he doubted, especially as they had not proved satisfactory in dealing with the adulteration of food. Very few prosecutions were carried on under the Acts for the suppression of adulterating food, and it was questionable whether a system of inspection and State prosecution would not have to be resorted to in such cases. The discussions which had arisen on this subject would be useful in considering this Bill; but, as it was most desirable the House should have full evidence before it as to the facts complained of, he hoped the hon. member would consent to the Bill going before a Select Committee.

Mr **Read** hoped the Bill would be read a second time and proceeded with by the House, instead of being sent to a Select Committee. The facts were notorious among those interested in the seed trade, and amounted to a system of unmitigated rascality. To send the Bill to a Select Committee would be to shelve it for the Session. Admitting that people could not be made honest by Act of Parliament, he observed that the evil
they sought to put a stop to was that h
ters of seeds were annually killed in la
put up for the purpose. He would ratl
false money at large than permit this
continue, because in the case of a co
loss was apparent and definite, but in
the loss was not discovered until the far
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article. He believed no thorough re
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meantime he hoped the Government
passage of this Bill, and, in the name of
demanded it as a right.

Mr **Synan** gave his hearty support t
"innocent purposes" alluded to by the
Boston (Mr Collins) had been provide
section, and he could not conceive wha
member wanted the Committee to subst
this work would be done by the courts o
case that came before them.

Mr **Brand** said the proper time for c
the Bill should be sent to a Select
after it had been read a second time,
upon this point that, although it would
to throwing the Bill out to send it
Committee with instructions to take evid
yet to send it to a Select Committee
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He recommended the hon. member in
measure to do his best to meet the o
by the Secretary to the Board of Trade
stage; if this were done the Bill might pr
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Trade to raise the question of sending th
Committee—a necessity, however, whic
House would be spared.

Mr **Henley** said the evil the Bill soug
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Bill would remedy it, because of the d
Would it be easy to prove that any kille
heated purposely by a kiln, or naturally i
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oppose the second reading, he pointed out this difficulty of proof, and hoped the hon. member would do his best to find a means of overcoming it.

Sir P. O'BRIEN observed that the small occupiers of Ireland were especially interested in this Bill, though many of them were ignorant of the existence of the evil it sought to remedy. On this account he would prefer a Select Committee to take evidence on the subject with a view to circulate the information throughout the country. The objection that criminal prosecutions would not be undertaken under this Bill would not hold good as regards Ireland, because there the Crown prosecutor would undertake them, and for this reason the Irish farmer would be better protected by a penal than a civil remedy. He counselled delay rather than immature legislation.

Sir F. HEYGATE remarked that the north of Ireland was more interested in the measure even than other parts of the country, because of the great care necessary in the preparation of the flax seed. In Ireland the large landlords who had the interest of their tenants at heart usually purchased large quantities of good seed, which they distributed among their tenants, and in almost every instance the money was repaid with the greatest alacrity, and the practice was regarded as the greatest benefit. The small farmers, however, had to depend upon the tradesmen of the neighbouring towns, and anything more uncertain than the quality of the seed which they sold it would be impossible to mention. The hon. member who had brought in this Bill had done the greatest service to the community.

Mr MORRISON said they had some experience which might throw light on this question in connexion with the Adulteration of Food Act, which they all knew had proved a dead letter. If the farmers of England chose to combine in order to purchase seeds they had the remedy in their own hands. There was no excuse for adulteration on the ground of small profits, because the profit made by the retailer on the wholesale price was over 36 per cent., and it was known from experiment that the average adulteration was about 50. The question was a serious one in this respect, that the tendency of adulteration was to drag down the honest to the level of the dishonest dealer. He believed that there was in the seed trade a real desire among respectable houses to put down this practice, and he had no doubt they would do their utmost to make the Bill work successfully; but he had the greatest possible doubt, whether, like the Adulteration of Food Act, it would not prove a failure. Then it was a question whether the publication of the analysis with the name of the vendor might not render the parties who published it open to a charge of libel. Even the publication of an analysis of the adulterated article would be of no use unless side by side with it there was also published another analysis shewing what the genuine article should be composed of. The publication of the analysis ought to be made a privileged publication. When strong language was used between a dealer and a farmer who found himself taken in, the Seedsman might threaten an action for libel, and the farmer was generally so much afraid of law that he would not go further. Much good, however, might be done by means of societies like the Royal Horticultural. Though he should vote for the second reading he was of opinion that unless the greatest care was taken the measure would prove a dead letter

Mr W. JOHNSTON hoped the Bill would not be shelve and maintained that speedy legislation was absolute necessary.

Mr BRIGHT: I did not hear the observations of hon. friend the Secretary to the Board of Trade; but any member of the House gathered from them, which think he could not, that the department with which and I are connected is opposed to the second reading this Bill, he made a great mistake, because there ca be no doubt, I think—I can have no doubt—from th statements made to me by two very important deput tions, that there is a grievance of considerable magn tude in connexion with this question, and it would ve ill become the House of Commons to deal with th grievance in a manner different from that in which it accustomed to deal with other evils and other grievanc which exist in the country. The real question, whic was referred to by the hon. member for Plymouth, whether this Bill would be of great use. If it can shewn that it would be of great use, by all means pa it; but as this is a new question I think it is at lea desirable that the House should make some inquiry ascertain the extent of the grievance, the mode in whic it arises, and whether the Bill as it now stands, or as may be altered, or whether any Bill can be a sufficie remedy for the evil which is complained of. The Hou must bear in mind that the Bill does not refer at all what the Royal Horticultural Society describes as a gre portion of the evil. It refers only to those seeds that a intentionally killed for the purpose of deception. does not deal with that species of seed which being ol has lost its germinating power. Now, the Royal Hort cultural Society, in their report, say that that is the mai portion of the grievance, and yet that is what the Bi entirely ignores. Let the House bear in mind what a the difficulties of this question. The hon. member wh moved the second reading of the Bill and the ho member for Norfolk must know a great deal more abo it than I know, for what I know has been gathered chief from the deputations I have seen on this subject; b they tell me, and it is quite clear, that the seed of certain harvest is very much better than that of anoth harvest—very much better in one farm than in anoth farm; in fact, that it varies from causes which we ca not control, and which we cannot in the smallest degr comprehend; that if seed is too long kept it is as inj rious as seed that is actually killed for the purpose adulteration. It is impossible in many cases to sa whether the seed has died naturally or has been kille by some artificial process. It is not always possible tell whether the seed has been coloured and dyed f the purpose of deception, or whether it has bee coloured by the circumstances of the harvest. Wh there is no crop, or a bad crop, from seed which a farm has put into the ground, it is impossible for him to te whether the failure is owing to some peculiarity in th soil, or owing to the peculiarity of the season. I wi undertake to say that the most honest seedsman in En land, and I think the most honest farmer, if we had hi here, would admit that if you put seed of the very same cla in two different fields, not more than a quarter of a mi apart, the crop in one field will be in many cases doubl and often more than in the other field. Therefore, th is not a simple question, but one of the most complicat kind, which the men of the Horticultural Society the selves are just as much puzzled about as I who am most unlearned on the matter may be expected to be. The sub-committee of the Horticultural Society at the close of their Report explain a plan by which farmers can easily, if they like, ascertain before seed is put into the ground whether the seed be good seed or not. They say they have considered the various modes of testing seeds which are known to them, and that which they feel inclined to recommend as, on the whole, the easiest, cleanliest, least troublesome, and most likely to be acceptable to the general public is the placing of the seeds between folds of moist flannel, and keeping them in the temperature of a sitting room or kitchen for a few days. It may not answer for all seeds, but it answers perfectly for most kinds, and any seed that gives a good return under it may be depended on as certain not to give a worse result when actually sown. They say an idea of its efficacy may be gathered from a trial of it made by one of the committee, upon 100 seeds of one of the sorts whose average of good seed had in previous trials been found to be 75. The method recommended gave 25 seeds germinating on the third day, 23 on the fourth, 16 on the fifth, 9 on the sixth, and 3 on the seventh —total 76. The council recommend that this plan should be made as widely known, and its practice be as strongly inculcated, as possible. Now, although that is quite true, and although it may be important that all farmers should know it, and I have read it here that it might be more extensively known, still it does not follow that if Parliament can legislate so as to put an end to this evil, Parliament should not do so. The right hon. gentleman the member for Oxfordshire, who, besides being a statesman of great authority in this House, is somehow or other—I do not know whether from education or from a natural qualification—very much of a lawyer. I hope the right hon. gentleman does not think that I am saying what is unfair to him in saying that, for I often wish myself that I were a lawyer. It would add to one's power of discussing many questions in this House. But the right hon. gentleman has laid before the House some difficulties of this Bill. He is of opinion—and I think all persons connected with trade who have considered the matter calmly are of opinion—that the Bill as it stands—and I am not sure it would not be true of any Bill—will be a very great embarrassment in trade. I have seen this morning one of the most extensive seedsmen in the kingdom, and I believe he is one of the most honourable. He says the evils which are complained of are greatly diminishing; and that with regard to some particular branches of the trade they may be said altogether to have become extinct; and he feels that the greater intelligence of farmers, and the greater necessity they feel of being careful on this matter, will of itself tend greatly to diminish or remove the evil altogether; and that legislation is not necessary. He says that whatever good legislation on this subject might do, it would be accompanied by this great evil—it would put some thousands of persons in peril of litigation, from which they are now to a considerable degree exempt—litigation which would be not only wholly unsatisfactory to the dishonest, but most unsatisfactory and embarassing to the honest tradesman. One gentleman who has written to me, but asks me not to mention his name, says that he sued a farmer for 19s.—a debt of three years' standing. The farmer retaliated by bringing an action against him, charging him with havi sold to him fourteen pennyworth of Swedish turn seed, being 2 lb. in weight, which he was to sow in acre and a-half of ground. The farmer accused him selling seed that was not honest. [Mr C. S. Rea "Perhaps he did not sow enough."] The gentleman te me that in defending that action he had occasion to spe £166. That the farmer claimed for damages £100, whi would be more than enough to buy the fee simple of t acre and a-half in which he sowed the 2 lb. of seed, a the jury gave a verdict for £12. The clause of the Bill mak it penal to destroy or kill seed, or to cause seed to be c stroyed or killed by any process, with a view to dishon practices. But even with regard to that clause, h could it be carried out? One of the deputations th waited on me told me they believed there was one pla in London in which not less than 1000 tons of seed h been killed in a year. [Mr C. S. Read: "Quarters I will take quarters, if you like. They told me there a many places in which seeds are killed. Others tell that is a gross exaggeration, and that probably there only one known place in London where this is done, a that generally the practice is very much dying out. E how are you to manage to carry out this clause unl you appoint inspectors? The Bill does not propose appoint inspectors. And if you appointed inspectors y would have one-half of the population inspecting t other half. If the Bill appointed inspectors the would be no end of patronage for my right h friend at the Home Office. But when you come clause 4, there appears the technical objection me tioned by the right hon. gentleman the member for C fordshire. It proposes to enact that any one knowing doing the things prohibited by the Bill shall be subject a penalty; but how are you to prove that the seed deal throughout the country have "knowingly" done this a that? The Bill does not apply to seed that comes fr the Continent; and yet one-half of the seed sown in t country may come from abroad. It is impossible many cases to distinguish what is good seed and what bad—what is bad through the act of man, or what is b owing to the climate or the harvest. The question what ought the House to do? I am bound to adn there is considerable mischief existing. The deputati of the Horticultural Society, and a large deputation th attended at the Board of Trade, stated facts which would be absurd in me to deny with so little knowled as I have of the matter. This very day I have receiv a letter from the oldest firm of seedsmen in London, th is the firm of Minier, Nash, & Nash. Nobody w say that they are not the most respectable house in t trade. They have been in the same premises for tw hundred years. They say—

> "It is well known that seeds often fail in growth fro causes beyond the merchant's control. One man w get a good crop, and another almost a failure, from t same bulk of seed. It would, therefore, be a most int lerable nuisance that a party could go before a magistra and make a charge that we had sold him adulterat seed, leaving us to make out our case to the contra which would be an utter impossibility, seeing that t seed might have gone through a dozen hands from t time it left the grower in Germany or elsewhere."

I mention this, to shew that this is not a question to dealt with suddenly by two or three clauses in a which have not been fully considered. Therefore, as it is undesirable that we should pass a law that would have no effect, and would be a delusion to those for whom it was supposed to be a benefit, I think it is well that after the Bill has passed a second reading it should be referred to a Committee. This, fortunately, is not a question of party. My hon. friend the member for Cambridgeshire, if he were a member of that Committee, would see that everything fair was done with regard to this matter. Hon. gentlemen opposite connected with agriculture would be disposed to consider the subject fairly in that Committee, and the right hon. gentleman the member for Oxfordshire could give them valuable assistance. The hon. baronet the member for King's County said he did not consider there would be much harm in having the Bill considered, though it might put off legislation to next year. Well, the delay to next year is no great delay. We do not want to delay legislation for a month or a week. We are anxious—I am very anxious we should not do anything in legislation which is not carefully considered, and full of effect, as far as good effect is concerned. I hope, therefore, the hon. member will have his Bill read a second time and agree to have it sent to a Select Committee. I do not wish that in that Committee every person should be examined who wanted to be heard, or that we should make a large blue-book out of the evidence ; but there are many important questions upon which we can have evidence, and there are some witnesses in the trade who would have a right to be heard in that Committee in answer to some points raised in the discussion here to-day. If the hon. member agrees to that, I will give my consent to the second reading, and I congratulate the House most heartily that there is a fair prospect of something being done to put an end to a grievance which is a great loss to the farmers, and is discreditable to a number of traders in the country.

Mr HUNT, as the representative of an agricultural constituency, tendered his thanks to his hon. friend for having introduced this measure, and he was sure the ability he had shewn in stating the case would justify the confidence which they felt in leaving it in his hands. He was glad, notwithstanding the strong speech which the President of the Board of Trade had made against the Bill, that he was prepared to support the second reading ; and if the ability which the right hon. gentleman had shewn in discussing the measure were applied to improving it, he had no doubt that they might pass the Bill his session without any complaint on the part of those ffected by it. On a former occasion the right hon. gentleman had said that the principal function of the post which he enjoyed was to give advice, which nobody followed. But in this case the right hon. gentleman [illegible]ght [illegible] advice wtth a [illegible] result [illegible]nd turn his department [illegible] some p[illegible] [illegible] [illegible]ght hon. gentleman [illegible] [illegible] [illegible] [illegible] [illegible]bject, but [illegible] [illegible] [illegible]ole aptitude [illegible] [illegible] [illegible] [illegible] [illegible]e right hon. gentleman [illegible] mentioned [illegible] [illegible]nt circumstances which might affect [illegible] productive character of seeds, and pointed ou[illegible] [illegible] difficulties which might arise if all persons who sold seeds which did not germinate were liable to a criminal process. But this Bill did not profess to deal with seeds the failure of which [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] which the vendor had no control. The Bill only dealt wi seeds "knowingly" destroyed or coloured, and ther fore the objections of the right hon. gentleman, thoug exceedingly plausible, did not really apply to the pa ticular provisions of the Bill. His hon. friend himself, introducing the Bill admitted that the evil was one, tl greater part of which no legislation could touch ; b this Bill professed to deal with those cases which legisl tion could touch—namely, the fraudulent adulteration seeds. He did not know where the establishments we situated which killed and coloured seeds, but he thougl there must be one at Boston, because his hon. friend wh represented that borough was so exceedingly anxious th the measure should not go forward this Session. H had no doubt that under the third clause there would b very little difficulty in locking up the establishments s up for carrying on this fraudulent trade. He hoped th the President of the Board of Trade would assist his ho friend in putting the Bill in such a shape as that th House could accept it, even though it might be afte wards referred to a Select Committee. Where it was question of agricultural seeds which affected the whol community, because it affected the price of the food the whole population, the President of the Board Trade might surely take it upon himself to give ever assistance to his hon. friend.

Mr WALTER said he was aware of the great difficultie with which this question was surrounded, and it had ofte struck him in walking through one of these magnificer displays of seeds seen in agricultural exhibitions how came to pass that the practice of adulteration did nc prevail to a much greater extent. Any one who walke down through the long rows of bags of various kinds c seed displayed in these exhibitions must have an extremel practised eye to be able to distinguish one from anothe But there was no doubt that a grievance existed of a mos cruel and abominable character, which it was impossibl for that House not to do all it could to put an end to He was glad that no opposition was offered by th Government to the second reading of the Bill; but th question was really how to give effect to it, and if hi right hon. friend the member for Northamptonshire ha not already made the suggestion, he should have venture to recommend that the Board of Trade should tak counsel with the hon. member who had charge of th Bill, and see whether or no any other machinery could b devised for giving effect to the measure without at th same time exciting unnecessary litigation, and throwin the whole trade into confusion. He was sure that an one that took the trouble to read the fourth and fift clauses would see that they were absolutely unworkable a they stood. In the first place there was the word "knowingly," which would give rise to the greatest difficulty, an then there was no limitation laid down as to time whether it was within a week or three months after th seed was bought, or whether the buyer had to wait unti the harvest was over before he could bring his action It was easy to see that under these clauses as the stood the greatest injustice might be perpetrated o a most honourable seedsman, who might have i his possession seeds imported from abroad which he coul not know to be adulterated without a most careful analysis, for which he might have to provide a very costl machinery. While, therefore, the House was bound t afford every reasonable protection to those who could no protect themselves, on the other hand, it was also bound to take care that that Bill or any Bill was not made the means of vexatious litigation and unjust pressure upon a class of persons many of whom he knew to be highly respectable tradesmen, and to be strongly in favour of the Bill. It was, therefore, a simple practical question which the Government had to determine—whether they should be able between the second reading and the time for going into Committee to frame such clauses as might render the Bill operative before sending it to a Select Committee.

Mr **Norwood** said the third clause would have the effect of closing establishments for colouring seeds in England, but would not extend to seeds imported from abroad.

Mr **Kinnaird** said the Bill had been received favourably in Scotland.

Mr **Welby** rejoiced to perceive that there existed so general a concurrence of opinion that some early legislation on that subject was desirable. He was not u willing to admit that considerable modifications might required in the measure in order to bring it into a wor ing shape. That subject had been thoroughly ventilat for several months past, and as far as the facts relati to it were concerned, they were not denied ; and it w scarcely necessary to take evidence in reference to the If it should be deemed requisite, he should not object the Bill going before a Select Committee, provided t Committee were instructed to confine its attention to t recasting of the clauses of the measure.

The Bill was then read a second time, and on the F day following, was referred to a Select Committee, co posed of the following gentlemen :—Mr Henry Bra Sir Michael Hicks Beach, Mr Clare Sewell Read, Shaw Lefevre, Mr Collins, Mr Cross, Mr Norwood, M'Lagan, Sir Henry Selwin-Ibbetson, Mr Morrison, Cogan, Mr Backhouse, and Mr Welby.

PROSPECTS OF THE HARVEST.

MR H. KAINS-JACKSON, of Mark Lane, in a letter in the *Times*, says it is not easy to ascertain the actual position of the country, from the absence of stock statistics and other means of information, except by personal inspection and close attention to the subject. For instance, as to stocks of wheat in farmers' hands, from the great scarcity of corn stacks—visible to the eye—we might at present suppose the late crop was well nigh exhausted; yet, when we consider that the employment of the thrashing machine often reduces, in a week, the entire produce of a farm into granary stock ready for market, and as market supplies are still liberal, the returns of sales from 150 towns shewing the trade of the present season more than double that of 1868, prices being then 69s. 1½d., and now 45s. 8¼d. per qr., the conclusion must be that stocks in farmers' and dealers' hands are yet considerable, and sufficient for the eight weeks more during which they will be required for consumption, wheat being now in ear, and in early districts in bloom. Since the 15th of the present month I have enjoyed a fair opportunity of making an estimate of the present crop prospects in the large corn-growing districts of the East coast, the importance of which, as the natural area from which we must mainly draw our present and future cereal supplies, is shewn by the following figures :—The average ar corn-cropped in Essex, Suffolk, and Norfo ranges over 45 per cent., whereas (*v* *Statistical Journal*) the South Midla counties reach but 40 to 45 per cer the South-Eastern 35 to 40, until in t North-West the per-centage falls to betwe 15 and 20 per cent.; while, in respect to wh alone, the East grows 20 to 25 per cent., the Sou Midland and South-Eastern 15 to 20 per ce only.

As regards acreage, Lincoln, York, N folk, Essex, Suffolk, and Cambridge rather more than one-third of the whole c area of England. With the object of see the most country possible, at one period the season, I have visited Herts, Cambrid Norfolk, Suffolk, and Essex, *via* the Gr Eastern Railway, alighting at different statio and being thus enabled to walk throu different farms and meet at the princi markets the farmers and millers of the d tricts. The weather has been througho rainy, gloomy, and cold, and with ma wintry signs, such as the flight of wild du and geese, the season has been quite d couraging until since the longest day, wh a decided change (steady mercury, hig temperature, calm sea, and some sunshi occurred. The fact of the winds being N. and N.W. is not unfavourable, as in 18 and in 1826, during the months of June and July, the wind from these points forty days out of the sixty-one distinguished both the two hot years. On reference to my notes, I find that, first, as to the recent rain and hail storms, that wheat is not laid in any damaging extent, even when, from the magnificent point of view of Ely Cathedral, the eye looks over the level, far-stretching fen lands, where the stem and flag are, perhaps, heavier than elsewhere. In Norfolk, and especially in Suffolk, it is the exception to see part of a field laid. The worst appearance anywhere is a rusty top-colour produced by the cold day winds and low night temperature. Up to a certain stage all cereal crops may be considered as green crops, and until the milky grains are forming, moisture and the absence of the sun are much less felt than supposed, and plenty of straw and flag greatly helps to nourish and mature a large and well-filled ear. The wheat ear is now unsheathed, and in early districts in bloom, and hot weather is much desired. Last year's forcing heat, which at the time many growers expected to shrivel up the grain, has made us expect another abnormally early harvest, which we cannot have. However, I find the season is not very backward. Wheat is expected to flower in Cambridgeshire (see *Farmers' Almanack*) on the 25th of June, and this year, a week later, it will be general; many Kentish fields are already in bloom. To compress into one sentence the impressio received, I may say that wheat is at present promising crop and unharmed by such wet an cold as have prevailed. The wheat lands ar thick with a strong plant, but the light land and flats planted with wheat are thin, yellow and characterised by spiky and spindle corn. If these lands were in area one-ha instead of about one-sixth of the whole, o future prospects would be poor indeed. A it is, the loamy soils, the clay soils, and th fen lands promise us a good average crop. find out of the total number of fields marke I have down 78 good, 28 middling, 26 po crops, and, having with me a geological atla I was surprised to find the change from goo crops to poor crops almost certainly marke by passing from good to light sandy an gravelly soils, on which vegetation seem starved, as is even the case with hay in par of Norfolk, this crop being very heavy on a good meadows. The barley crop did n satisfy me; it looked yellow, aguish, an backward; but there are more marks "middling" against the fields than of "bad and in Essex and Norfolk the average "good" fields was equal to the others. Bea and peas are simply the strongest and large crop I have ever noticed for the last te years. Oats well cover the ground, whic means, they promise a capital crop in ordinar weather. Mangolds and turnips are in goo plant, and many fields getting into leaf.

Farm Architecture.

COTTAGE BUILDING IN CONCRETE.

IT is not easy to name a subject which has a more direct and immediate influence on the well-being of workers in rural districts than that of the houses in which they live. It is true, and "pity 'tis, 'tis true," that the term here used scarcely denotes with accuracy the character of the structures which are so frequently found existent amongst us, that of "hovel" being one more fittingly descriptive of this. Why this state of matters should be allowed to remain a blot, as it unquestionably is a blot, on our social fair fame, does not now concern us; we have said, in the pages of this Journal, enough, and perhaps more than enough, on this point, and can, when occasion serves, say more. But we would here again direct attention to a view of the matter which we have once and again broached while discussing the subject, and that is, that the difficulties connected with the subject are not, as some seem to think, altogether of a philanthropic kind; some are connected with the paying points. It is altogether useless to ignore the fact, that those connected with property will look at the pecuniary features of the subject; and in saying this it does not follow that it is condemnatory of their philanthropy; nay, on the contrary, it might be placed to their credit as an exercise of conscientious prudence. At the same time, there are points inextricably mixed up with the subject of a purely philanthropic and social character, so that if by some means or other the claims of these could be reasonably considered at the same time that those of the money feature were not overlooked, a great advance would be made. Hence it is that no small amount of experience has shewn us that the question of good cottage accommodation for our rural workers will never be considered definitely settled, in the sense of be thoroughly and well provided for, till sc means can be, or could be, discovered which the cost of the same would reduced to a minimum. One may be posed from, or urged by, the purest lanthropic principles to carry out a g work; but, on consideration, he may that he has really not the means, or, at events, that it would be imprudent, to c it out at its estimated cost; and yet it wc scarcely be fair to denounce his conduc being utterly selfish, and altogether inc derate of the claims of his people.

There are always two sides to a quest and without giving undue prominence either of them, it is a happy thing if practice, the claims of both can be reason met. In such a case there are but few who would not allow philanthrophy, and then, to kick the beam as ag the purse purely. Hence it is, for and other obvious reasons, not neces to be named here, that we have maintained that the future of the se ment of the cottage question lies mainl the answer to this question,—Can good sc healthy cottages be built by some m much cheaper than that generally adop We believe—have long believed—that can. In America and various parts of Continent, we have seen from time to modes of erecting structures remark cheap. But some of these, from preju against them, and from other considerat would not be well suited for this countr rather, would not "take well," as the p goes. We have looked, therefore, in th rection of concrete as a material which give satisfactory results, and in spite o opposition which its use has met with are glad to see that its use is greatly on the increase. A very large number of cottages and other buildings are now erected with it, and at a very much cheaper rate than when built of brick or stone—a saving varying from 25 to 50 per cent. A village, as it may be called, of concrete cottages, is being erected at Carberry, near Musselburgh, on the system of Mr Tall of London, and a large extent is also being done by the Messrs Wilkinson of Newcastle, and by the Messrs Drake, Brothers, & Reid, of London. This latter firm are erecting, what is, we believe the largest structure yet attempted in concrete, the Hydropathic Establishment at Melrose. They have also built many cottages, and are building many more. We have before us the plans of two-storey cottages, now being erected by them for Sir Arthur Hazlerigg, the cost of which is for the pair containing twelve rooms, £175. Lord Ashburton has lately built cottages at a saving of 50 per cent., as compared with brick, and the writer of the present article is about to erect a cottage, the estimate for which, in concrete, is exactly one-half of that for building the same in bric The rapidity with which the walls of a buil ingareerectedin concrete, isanother feature the system, and Messrs Drake, Brothers, & Rei tell us of a cow-house, 95 feet long and 2 feet wide, having been built—*i.e.*, the walls o it—in three days only. A good deal ha been said of the strength of concrete, o rather its weakness. On this point we ca say something, having seen a large amount o concrete work done; and that something i to the effect that concrete is stronger tha brickwork. But the other day we had a ma hammering with a heavy hammer at a 9-inc concrete wall, each stroke of which woul have done serious damage to a brick wall o the same thickness, if, indeed, it would no have knocked a hole in it; and yet th impression made on the concrete was visibl only upon close inspection. On these an other points connected with concrete, it cost, and the modes of using it, we sha have more to say in succeeding papers, a we are preparing illustrations of a practica kind for the benefit of those intending t carry out the system.

Our Permanent Pasture Grasses.

FESTUCA OVINA[*] (Linnœus)—SHEEP'S FESCUE GRASS.

SYNONYMS.—*Grammen durius* of Lobel 1591. *Gramen minus duriuscula* of Gerarde, 1597. *Gran junceis* of Banhinus, 1671. *Gramin capillatum* of Vaillant, 1747. *Poa foliis setaceis* of R Flora Leydensis, 1740.

DESCRIPTION.

ROOT perennial, and strictly fibrous; plant usually from 6 to 10 inches in height, composed of a thickish tufted mass of rigid upright or slightly curved involute bristle-like leaves, from among which arise numerous erect two - or three-jointed square or angular stems, each of which is surmounted by a pretty compact, simply branched unilateral panicle; spikelets alternate, generally containing six florets, which are usually shortly awned, but in some varieties awnless, and in others prominently awned. It flowers about the middle of June, and ripens its seed in from three to four weeks thereafter. Compared with the other common native fescue-grasses, the F. ovina comes nearest to F. duriuscula, but differs from all the varieties of that species in being much dwarfer and smaller, as well as more rigidly erect in all its parts; also in its stem-leaves being always cylindrical or never flattened; in having only two or three stem joints near to its base; in that part of the stem next to the panicle being rough and angular, instead of being smooth and cylindrical; and in its close tufted growth, which arises from being devoid of spreading underground shoots or roots.

NATURAL DISTRIBUTION.

Common in dry soil; of medium or inferior quality, throughout the temperate and arctic regions of the northern hemisphere; ascending alike to the highest altitudes and most northern latitudes of phænogamic vegetation, but decreasing in frequency
climate assumes a subtropical charact
as the natural verdure becomes indica
superiority in the soil. In Britain the
fescue abounds on rocky and prec
coasts, as well as on sandy seaward
becoming comparatively rare in the
arable meadow districts, but increasin
in frequency in upland pastures, till i
of high mountainous districts it forms
spicuous feature in the grassy sward
are deemed the soundest and best shee
Still higher it passes the limits of
which nature has assigned to most of
country companions, and associate
those Alpine grasses and other forms
tation peculiar to our highest m
summits, and which are only found at
vations in the most northerly attainabl
regions. In confirmation of this, vis
the highest mountain summits in eith
land, Scotland, or Wales, have only t
the uppermost plant of grass which t
find, and in at least five cases out o
will be either the ordinary, the fine-lea
the viviparous form of F. ovina.
among the collections of dried plants
home by arctic explorers, from their
latitudes they have succeeded in re
specimens of one or all of these v
generally have place.

QUALITIES AND USES.

In the table prepared by Linnæus
periments conducted in 1747 and 174
638 plants, for the purpose of "shewin
that are eaten or neglected by the fiv
common domestic animals, oxen,

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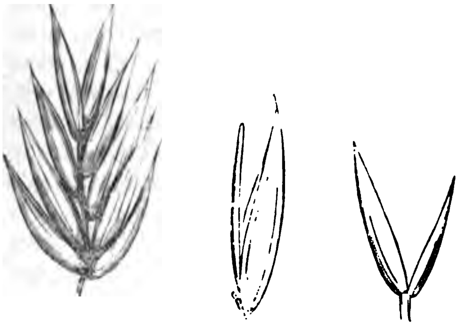
[*] From the Celtic *fest*, pasturage, and the Latin *ovina*, a sheep.

horses, sheep, and swine," it appears that the F. ovina was eaten by the first four, and that it was not tried with the swine. White common rye-grass was eaten by oxen; eaten by some goats, and refused by others; refused by sheep, and not tried upon either horses or swine. The same eminent naturalist and author also recorded, as the result of his observations, that sheep have no relish for hills and heaths that are destitute of this grass. And John George Gmelin, a contemporary Russian botanist, who published his "Flora Siberica" in 1747, stated therein that "the Tartars choose to fix, during the summer, where this grass is in greatest plenty, because it affords a most wholesome food for all sorts of cattle, *but chiefly sheep.*" This favour manifested by sheep for pastures where the F. ovina abounded, seems to have guided the immortal Swede in his choice of its specific name. He does not, however, affirm that the preference of sheep for pastures wherein this grass abounds arises from any superiority or [illegible] possesses. On the contrary [illegible] associated with [illegible] sheep [illegible] itself; not, however, because of its being either innutritious or disliked by any kind of stock, but

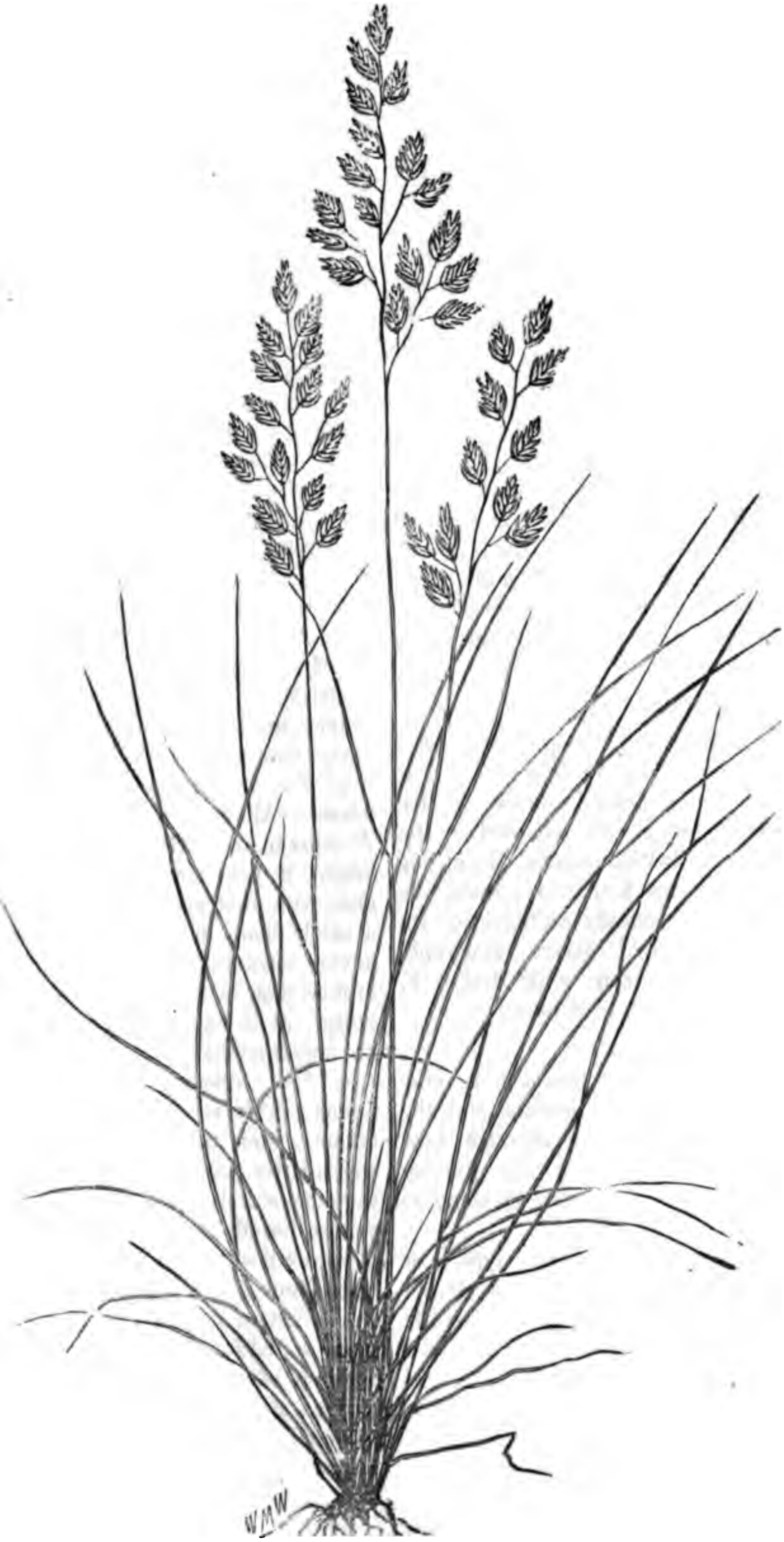


Floret magnified. Calyx magnified. Spiklet magnified.

as compared with many others, its growth i so very diminutive, and its bulk of produc so small, that good, or even moderatel fertile soils might be more profitably occupie by larger growing and more valuable kind Its restricted presence in permanent shee pastures, especially when the soil is sand gravelly, or of a dry moorish nature, is stil however, liked by many; and this need b little objected to in the afterstated proportion The name of this fescue, more than an actual merits possessed by it, seems to hav secured for it a place among the earlie cultivated strictly perennial grasses. Accor ingly, we find that, in England, Mr Aldwort of Stanslake, collected a sufficiency of i seed, along with that of others, "to begin stock with in 1761;" and in Scotland, D James Anderson of Monkshill, Aberdeen shire, cultivated it about the same time, o shortly after: and in his essays relating t agriculture, of which we have only the thir edition, published in 1784, is a good engra ing of it, accompanied with a very corre description, and a recommendatory report c his experiments. By those in the Wobur grass garden we find, however, that the pr duce from a light sandy soil was at the rate c only 5445 lb. per acre, at both the periods c flowering and seed ripening, or 12,931 lb. le than F. duriuscula at the former, and 13,61 at the latter stages in its growth. From th hardness, elasticity, and slow growth of i foliage, it has been recommended for fin lawns, bowling greens, and cricket ground But its tufted habit of growth, and th brown appearance presented by the centre of these tufts, entirely unfits it for these pu [illegible]; the only variety that is at all sui [illegible] even admissible being the F. ovin [illegible]

[illegible] AND SOWING.

[illegible] seeds are considerably smaller, b [illegible] awned, and they consequently weig heavier per bushel than those of F. duriuscul The computed number in 1 ounce bein 64,000, and the average weight 14 lb. p bushel. The greatest number of these brai when covered with not more than ¼ of a



Festuca ovina—Natural size.

inch of fine mould; only half as many come up when the covering is between ¾ and 1 inch, and none vegetate when buried under 2 inches of earth. Hence the greatest care is requisite, when in sowing and covering the seeds, to have the soil finely reduced in the first place, and in the last, to cover with a light roller only, is preferable to harrowing in and then rolling, when sown by themselves; in mixtures, however, the larger kinds of seed will stand more covering, and a light grass-seed harrow may be passed over the ground after sowing, which should be followed by a light roller. When sown alone, which is seldom advisable, 25 lb. of seed will suffice for an acre; but in mixtures, with clovers and proper porportions of other grass seeds, the quantity need not exceed 2 or 3 lb.; and for fine grass lawns or playgreens, seeds of the fine leafed variety, No. 6, may be introduced in quantities of from 3 to 6 lb.

CHEMICAL ANALYSIS.

The F. ovina was not among those grasses experimented upon by Professor Ways at Cirencester; and, therefore, we can only give the less satisfactory results recorded in the "Hortus Gramineus Woburnensis," according to which it was not found to possess the nutritive powers generally ascribed to it; the estimated nutritive extract being only 127 lb. 9 ounces per acre, while that of F. duriuscula was fully 199 lb. 6 ounces.

VARIETIES.

The F. ovina is more constant in its characteristics than the F. duriuscula, and the following permanent forms, although now generally considered as being only varieties of it, have formerly been treated by some as distinct varieties.

[illegible] ...ica. [illegible] ...viously de[illegible] ...graving of th[illegible] ...sents [illegible] ...milia [illegible] stronger growth than [illegible] last [illegible] further differs in the light greyish or silvery colour of its foliage, stems and panicles which renders it a favourite with growers and admirers of ornament foliaged plants for decorating flower-beds, a forming carpet-like designs in fine grass lawn It is a native of the Alps, but supposed n to be indigenous to any part of Britain.

3. *F. o. glauca* (*F. glauca* of most author but named *F. cæsia* in Smith's Engli Botany).—This is of a stronger and mo loose habit of growth than either of the pr ceding. In the Woburn grass garden i produce, from a brown loam, was both at t time of flowering and at the time of see ripening, at the rate of about 9529 lb. p acre. Colour of whole plant glaucous gree like the grass of carnations and pinks, b not so light or silvery as the last. I no means uncommon on rocky and oth dry sea coasts, and sometimes found at hig altitudes in Britain.

4. *F. o. hirsuta* (*F. hirsuta* of some is only distinguishable from the first by i panicles and florets being downy or hair Found in dry rocky localities, but by n means common.

5. *F. o. hordiformus*, or long awned sheep fescue.—Although described as a variety *F. ovina* in the "Hortus Gramineus Wobur ensis," it has few characteristics in co mon with that species. The produce, fro a sandy loam in the Woburn grass garde having been 13,612 lb. of grass at the ti of flowering, or more than double that of t other. It is stated to be a native of Britai but somewhat rare.

6. *F. o. tenuifolia*, or fine-leaved sheep fescue.—This is the F. angustifolia of som authors, and the F. tenuifolia of other which latter name is here retained as bein the most strictly correct, and from being th almost usually adopted in seed catalogue Compared with No. 1, its leaves are fin much longer, of a lighter green colour, an less tufted or crowded together, hence it better suited for fine grass lawns. Its seed are also of a brighter yellowish colour, a well as smaller, less distinctly awned, an consequently somewhat heavier per bushe About 80,000 of them are contained in 1 oz and great care must be taken not to ove cover them in sowing. In dry mountai

pastures this is often more prevalent than the first, with which its geographical distribution seems to be co-extensive.

7. *F. o. vivipara.*—The viviparous or grass-upon-grass sheep's fescue.—This variety is naturally associated with the last, as well as with the typical form of the species in arctic, and alpine regions. In Britain it is common at altitudes of about 2000 feet, but descends to much lower elevations by the sides of mountain streams, and where excessive moisture in the atmosphere prevails. It occupies a prominent place in the alpine flora of all the mountain chains of Europe. In the eastern United States of America, the summits of White Mountains in New Hampshire are southern habitats, and on the Rocky Mo tains it extends to much lower, although yet undefined latitudes. This variety is ne cultivated except as a curiosity among ot alpine plants, or in flower borders, its pe liarity being that of producing grassy, inst of seed-bearing panicles, the germs from tl earliest stages being metamorphosed i plants which put forth one leaf after anotl till at full maturity they fall to the grou where they soon take root, grow, and variably reproduce viviparous heads.

The Farm.

THE NEW SYSTEM OF MANURING CROPS.

THE bodies with which we have now to concern ourselves with have this remarkable peculiarity, that their principal qualities are composed of animal matters. They contain, besides the three elements of the bodies last noticed, a great quantity of nitrogen.

Gluten.—We have seen that when mixing a paste of the flour of wheat under a stream of water, there remains in the hand a sticky matter, called gluten. Water does not dissolve it. Treated by alcohol, it gives two identical substances in their composition—casein and albumen. The matter which remains after this treatment has all the properties of animal *fibrine.*

Albumen.—This is very much present in plants, and is identical with the albumen of the blood and of the egg.

Casein.—Vegetable casein is analogous to wheat casein. It also bears the name of legumen. It is slightly soluble in water, incoagulable by heat, and insoluble in alcohol. Peas, beans, and lentils contain nearly 12 per cent. of it in their weight. We meet with an infinite number of products of all kinds in vegetables; acids, *bases*, fatty bodies, essences, colouring matters, &. [illegible] t is n[illegible] our province to take [illegible]

[illegible]

[illegible] vegetable [illegible] all rational systems of manuring ought to be [illegible] this principle. [illegible] see then, from what sources vegetables receive the elemen which get into the composition of their tissu

Let us at once say, with regard to t origin, that these elements are hydro-aer and earthy, that is to say, that the one from the atmospheric air and from wat and the other from the soil.

The atmospheric air, or more simply t atmosphere, is that invisible transparent a insidious in all normal conditions, which e circles us all round, and extends above us the height which physicists estimate fr 40 to 50 miles. Essentially, the atmosphere a mixture of two gases, oxygen and nitrog in the proportion of 21 volumes of the fir and 79 of the second. Besides this, t atmosphere contains water, carbonic ac ammonia (a mixture of hydrogen and nit gen), of nitric acid, and different so matters.

The atmospheric air contains from abou to 5 ten-thousandths of carbonic acid, whi as we have shewn above, is a combination oxygen and carbon. Under the influence light, the green parts of the plant decomp this carbonic acid, fix the carbon in tissues, and throw off the oxygen into t atmosphere.

On the contrary, in darkness, the pla [illegible] the oxygen and give out the carbo [illegible] these last phenomena are the same animal respiration.

[illegible] these phenomena of the oxydation the tissues took, during the darkness of nig the same importance as the phenomena reduction which takes place during the day [illegible]s clear that the vegetables could not gro but the loss of the weight is much below t gain of the day.

The parts in the natural colour, other th green, gain in the day the same as the green loses in the day; they oxygenate and decarbonise.

The flowers, the roots, and other underground parts, the seed then growing, come under this case also. Nothing is simpler than the direct material demonstration of the fixing of carbon of carbonic acid upon plants; we quote the experience of MM. Boussingault and George Ville, to shew that when the seed is put upon ground with neither manure, compost, nor any carbonated matter, only showered with distilled water, the plant is developed, flowers, and is fruitful.

By weighing it, we are sure of the quantity which it has derived from the air. The quantity of carbon which vegetables take up in a season is very considerable. M. George Ville gives the numbers at 8000 kil. to the hectare of Jerusalem artichokes; 2000 for beet-root, 1700 for potatoes, and 1400 for wheat. According to French chemists, the taking in of the carbon is in proportion to the extent of the leaf surface of the different vegetables.

We may be astonished at the small quantity of carbonic acid which we have described as being present in the air, being able to give all the carbon taken up by vegetables. But this difficulty disappears when we recall the extent and height of the heavy atmosphere upon our globe, and think that this weight, reduced to its thousandth part, represents, even then, an enormous quantity, many times superior to that of all vegetables of the earth put together, because this calculation proves that the atmosphere contains 1500 bilions of kilogrammes of carbon. But do the plants only draw their carbon of carbonic acid from the air, or c they derive that other part of carbonic a from rain water drawn into the ground, fr which results the spontaneous decompositi of the manure in contact with the roots? Dumas believes that it is chiefly from the that plants derive carbon. How can it otherwise, he says, when we see the enorm quantity of carbon which has been kno to be put to the use of some trees, a for all that the small space to which th roots can extend? It is a hundred ye since the acorn has germed which has p duced the oak which commands our admi tion now, the ground upon which it fell d not take up the thousandth part of the carb which the oak itself takes up in a day.

M. Dumas admits, however, that the ro also take up carbonic acid in the grou According to this noted chemist, this carbo acid passes into the stem, and from ther into the leaves, to be decomposed there the rays of the sun or taken up by the air the plant vegetates in shade or during t night. According to him, plants do not p duce carbonic acid during the night; th only give leave to those which are deriv from the soil to pass away. We say, ho ever, that this last way of putting the mat is strongly contested by certain facts whi have been proved.

It is a fact, generally, that richly n nured lands or virgin soils are very ferti Is it to the carbonic acid furnished by t manure, or is it to its mineral matters which this fertility is due? M. George Vi has got returns of 40 hectolitres of wheat the hectare, by means of manure in which had no carbonic matter.

HAYMAKING.

THE French have a proverb which means "there are faggots *and* faggots;" we may make one for the nonce, and say here, there is hay *and* hay. Hay so nicely got, so finely coloured, so crisp, so sweet-smelling, that the most pampered prize ox will munch it with a zest; and hay so badly got, so limp and soft, so musty and mouldy, such marvellous foul stuff altogether, that the hungriest heifer will scarce be prevailed upon to eat it. All this implies that in haymaking, as in other branches of industry, there are two ways of performing the work connected with it, the good way and the bad way, dependent upon which is the quality of the hay. We do not overlook the fact that the weather at the time of haymaking influences, and must influence, the quality of the hay made; still, it is a fact, that, working under the same weather, the farmer who makes hay on the good system will produce a better article than he who makes it on the bad one. All this is evident enough and indisputable; still, the fact is sufficiently suggestive that the bad system is adopted in by no means a small number of districts throughout the kingdom. The difficulty indeed is, that the bad system *is* bad, or rather to get those who produce it to think at all about the matter, or that there can be a method other than that they have so long adopted. It will be well, then, to glance at the points involved in the making of good hay. The first and most obvious is to have as few worthless grasses and weeds as possible, and [illegible] useful grasses [illegible] best [illegible] y eight [illegible] growing on the best meadow land, while the number is reduced as low as three on poor land. Hence the necessity there is for making the most of the limited varieties at our disposal—first, by th choice of those best suited for the circumstanc of the soil; secondly, by having the soil s cared for that it will suit the plants, this latt of course involving the return to the soil in th shape of manure those fertilizing ingredien which the plants so rapidly carry off from i This manuring of the land is, however, much more important matter than at fir sight may appear, more especially where artificial manures are employed. It is not a easy matter to go wrong in the application farm-yard dung to meadow land, but it i much more easy to go wrong in the application of artificial manure, which requires th exercise of the greatest discrimination on th part of the farmer. These points being premised, we shall now take up those more immediate for the purpose of our paper. Th first of these is the period at which the grasse should be cut; to decide this properly, considerable judgment is required. If cut to late, so as to allow the seeds thoroughly t ripen, the natural juices dry up in the stalk and they become so much the nature c woody fibre as greatly to reduce the nutritiv value of the hay. On the other hand, if cu too soon, the juices are not properly formed there is a loss also of nutritive value. Th best time to cut ordinary meadow grasse is when the plants are in full flowe Italian rye-grass should be cut jus when the flowers are beginning to appea In cutting clover, the heads should be in fu blossom, though it is right to say that som experiments seem to shew that the hay mad [illegible] clover, cut when beginning to flowe [illegible] larger proportion of nutritive sul [illegible] the same cut some twelve day [illegible] we have said that the ordinary mixe grasses should be cut when in full flower, bu as the period of flowering varies with th varieties, that period at which the larges number are in flower should be selected a the time for cutting. This period will de pend very much on the season and locality. As a rule, however, this period will be found between the middle and the end of July.

Previous to the time of cutting, care should have been taken to have all the arrangements made for carrying out the work, implements and machines should be sought out and put in good working order. All this seems common-place enough, but common-place things are apt to be neglected; and not seldom does it happen that important work is badly done, and large losses also incurred, through want of that careful exercise of forethought which provides for all contingencies, and prevents the possibility of loss. Now that machinery is so much used, this prudent forethought is all the more essential. Reliance may be placed, for example, on a mowing-machine for doing a large amount of work, which may not be done simply through neglect in seeing that all its working parts are in perfect order, or by neglect in providing for certain contingencies which may happen during the period of haymaking. The same may be said of h tedding machines, and in another, but i less important degree, of the manual imp ments used. Although machinery is used a large extent in haymaking operations, th reducing the number of hands employ still it is bad policy to trust too much what machines can do, and to commence t season of haymaking under-handed. Fo is a most important point to take advanta of fine weather while it lasts, avoiding much as possible the risk of being caught rainy weather before the operation of h making is completed. To judge of the w in which haymaking is carried on by son one would think that the influence of ra upon hay in reducing its value was ve slight, whereas it should be remembered th hay under the influence of rain loses a co siderable proportion of the constituents nec sary to render it a nutritive food ; as point out by an eminent authority, water alo removes from hay more than a third of t nitrogenous matters which it contains.

THE SUMMER PASTURING OF STOCK.

THIS seems to be such a very simple matter, judging from the way many look at it, that it affords very little occasion for remark or suggestion, yet there are two or three points connected with it which will be worth glancing at briefly within the short limits of the paper we propose to ourselves; at present concerning ourselves only with cattle. In an article which appeared some time ago in this Journal on the subject of rearing, a remark was given on a point frequently overlooked—namely, the importance of rearing stock of a breed calculated for the climate and locality in which they are to be reared. There are no breeds, or perhaps it will be the more correct way to put it, there is possibly no breed which seems well calculated to do well under almost every variety of circumstances; still there can be no doubt this, that there is a great deal in the choice o breed, the characteristics of which are th enabling it to make the most of the circu stances under which it is placed. There i great difference in constitution, between t small and active animal accustomed to ro on mountain or hillside pastures, and habi ated to considerable varieties of temperatu and the heavy, lethargic and docile anin accustomed to the shelter of lowland pla and valleys. In purchasing animals, gre care should be taken, also, to see that th are free from disease; many diseases are mo or less latent in animals, the symptoms which are not, therefore, very obvio and require, consequently, to be ca fully looked for. If animals are in an u usually poor condition, it may reasonably be supposed that there must have been something the matter with them, for animals which have had complaints, such as the "foot-and-mouth" disease, and "pleuro-pneumonia," are, by them, reduced to mere skin and bone. Animals in this condition are unsuited for the risks of grazing, especially where the pasture is good. The rich grass acts upon them more as a purgative than as a nutritious food; and however heartily they may appear to eat, no real progress will be observed. In the grazing of stock in this condition, or which have been subjected to neglect, severe weather, or short rations during winter, it is the wisest policy to put them through what may be called a course of pasturing, beginning with the poorest, and gradually leading them on to the richest grasses. If this variety of choice is not within the reach of the farmer, it will be advisable to give the animal some artificial food when put into the pastures. This, in small quantity at first, but gradually increasing to a fair allowance, until that stage of improving habit of body is reached, when they may be left to the effect of good grazing alone. The general health of the animal should also be carefully attended to, particular attention being paid to the state of the bowels. All this requires the exercise of the greatest skill on the part of the grazier, and should, therefore, only be undertaken where that skill exists, and where the necessary care and labour be not grudged. From what we have said, it will be perceived that a corollary may be deduced from it—namely, that to get th full benefit of the summer grazing of stock, i is essential that those which have bee wintered within the personal inspection of th farmer should have been wintered well. W have so frequently, we may say persistently insisted upon the necessity that exists fo keeping cattle in good and regularly improv ing condition during the winter and earl spring months, that little more need be sai about it further than that if cattle are no so attended to in winter, the grazing of then in summer will not yield such satisfactor results as might be anticipated or wished fo Poor wintering will be poor summering.

One word as to the pastures themselves o which the summer grazing is carried out. I is scarcely necessary to say, that unless thes are good, good feeding results will not b obtained; and yet, this common sense vie of the matter is not seldom overlooked, if w are to judge from the way in which pastures by some, are treated, or rather we should sa neglected. All their attention seems to b given to the meadows; little or none to th pastures, as if it was important to have goo grass for the stock in the shape of hay, an not important in what condition the grass wa that is to be consumed in a fresh state. Thi is a great mistake, and should be avoided, a it can be avoided, by the exercise of care an forethought. We have, from time to tim given papers on the care of pastures, to whic we therefore refer the reader interested in th matter.

[illegible] VING OF STOCK.

[illegible] SHORTHORN CATTLE TO [illegible] BREEDS AS STOCK FOR BEING FATTENED.

THE excellence of every one of [illegible] ferent breeds or varieties of Br[illegible] cattle and sheep, has already been subject [illegible] notice in foregoing remarks; but of the various breeds of British cattle, the shorthorn [illegible] pre-eminent in attaining its full growth, and thereby [illegible] capability of being fattene at an early age. The advantage, in the [illegible] mentioned, of the shorthorn is fully s months over any, and even twelve month over some other breeds. Great as may b the advantage to be derived from the pr cocity of the shorthorn, there are other a vantages possessed by other breeds, such thriving better on pasture of inferior quality, and with exposure to a less genial climate than the shorthorn can endure, which may, to a great extent, compensate the early maturity of growth, and the rapidity of fattening, under circumstances of keep and climate favourable to the development of their peculiar merits as stock for being fattened.

Whatever may have been required as to selection of particular breeds of stock to meet the exigencies of the quality of the pasture and the nature of the climate of a farm in former times, inferiority of pasture need seldom be a sufficient reason for the exclusion of the shorthorn being selected as the stock for almost any farm within the parallels of latitude which include any part of the United Kingdom, as any deficiency in the produce of the soil may now be supplemented by extraneous feeding-stuffs from all parts of the world; and the facilities which are now offered for obtaining the means, which were formerly unknown, for the improvement of landed estates—particularly in providing shelter for cattle—and that frequently without any cost to the owner, render the highly cultivated and precocious, but less hardy shorthorn to be, in many cases, preferred at the present day as the most profitable stock to be adopted, where formerly animals of slower growth and feeding power, but of more hardy and primæval breed, were alone considered capable of being kept with advantage.

It has not unfrequently been subject of remark, that shorthorn cattle are more frequently of a defective form, and have the fault previously noticed of unduly small *lyer* or muscle than most other breeds; but when these occur with the breed in question, they arise from some fortuitous circumstance, and not from any inherent proneness of the breed to such defects. In discussing the present topic, it must be borne in mind that the shorthorn, as now to be found, is far from being a primæval or original variety of the ox. It is a variety produced by a careful cultivation, and from crossing of several varieties in bree ing; and hence it is that shorthorn catt are more impressible by influences in th breeding and after treatment, which act wi either good or evil effects, than cattle of primæval variety. Therefore, unless care exercised in the coupling of the animals of t opposite sexes in breeding, defective sha will not only be a consequence to be expecte but nature will be liable to sport in the mc decided deformity as the expect of an i assorted pairing of the sexes in breedir Whatever judgment may have been exercis in their breeding, cattle that have been starv during a period of their early existence– practice of much too frequent occurrence most districts of the United Kingdom—ne can be kindly feeding animals, and attain cellence in the quality of their flesh when f tened. For the reasons that have be adduced, it is that defects in fattened shc horns are to be more prominently seen th in cattle of more primæval breed, and it from their being less able to endure privati that the after effects of short keep in t starveling is more glaringly perceptible in t shorthorn than in other breeds of cattle.

So far from the defects spoken of in t last remarks as being so prominently to noticed in shorthorn cattle, when bred a reared under circumstances of sheer carele ness and mismanagement, being necessa qualities of the variety of cattle in questi there is no breed of cattle in which defe are so seldom to be found when treated w reasonable judgment and care as the sh horn; and the cattle of the herds of p fessed breeders of the shorthorns are rema able for absence of malformation, and striking similarity pervading each herd, a stamping it with an identity by which animals may be distinctly recognised by *noisseurs* of shorthorn cattle, in addition to excellencies possessed by the breed in cc mon, in a degree to which no other vari can lay claim.

DR VOELCKER AND HIS CHEMICAL EXPERIMENTS.

DEMONSTRATIVE experiments and their pregnant issues, such as those, for example, evolved by Dr Voelcker in the matter of clover as a preparatory subject for wheat, cannot be easily passed to one side. The painstaking character of the investigation, the time employed in working it out, and the evidence brought to bear upon the main points desiderated upon—to say nothing of the influence and power which the weight of the testimony of such an authority effects—are all so conclusive as to demand the most careful perusal and digestion of every one engaged in agricultural husbandry.

Scientific agriculture is beginning to be appreciated by the most advanced of practical farmers, co-ordinate with its importance in dealing with every-day out-door operations. To work upon the principle of manuring all kinds of soils with so many cube yards out of the muck heap, regardless of what their chemical constituents may be, is certainly groping in the dark, and committing blunders of a kind that may affect the most vulnerable point of all commercial dealers. Even so far back as the dawn of the present century, Lord Dundonald struggled hard, fighting an uphill battle with "the powers that be," to shew the intimate connexion between chemistry and agriculture; and how was he met? When intimating to one of the farmers of that day, who could see nothing good beyond the muck heap, that he looked forward to the time when an acre of ground would be manured effectively with a bag of artificial manure, "Yes," was the quaint and sneering rejoinder, "and the produce carried to the stackyard in my waistcoat pocket." But the march of progress in agricultural science carried all obstruction before it. Sir Humphrey Davy gave powerful impetus to calm investigation, and dozens of others have followed in his wake, till now we have not only the chemical ingredients of soils analyzed, and their virtues [illegible] and declared, but we have our indefatigable Voelcker shewing how, by the introduction of one crop in the course of rotation, farmers may profitably introduce a second without reference to the introduction of foreign materials at all, or, as the learned analyzer rather racily puts it himself when speaking to the point regarding wheat cultition, "the very best preparation, the very best manure, if you will allow me thus to express myself, is a good crop of clover."

The beauty and the value of the analysis and experiments are, to every practical farmer, that they have both a positive and a negative face; they not only teach what to do in order to arrive at desirable ends, but they teach what not to do, and that, too, in the management and utilization of the one crop. Clover crops, to act as a manurial agent, must undergo the usual harvesting process; they must be seeded, as is only partially the practice in vogue, and not fed off or become paddock ground for stock, else their manurial value upon the succeeding wheat crop is at a discount. And why so? Let Dr Voelcker speak for himself:—

> Because clover, by means of its long roots, penetrates a large mass of soil. It gathers up, so to speak, the phosphoric acid and the potash which are disseminated throughout a large portion of the soil, and when the land is ploughed, the roots are left in the surface, and in decaying, they leave, in an available condition, the mineral substances which the wheat plant requires to enable it to grow. Although in clover hay these mineral matters are removed in great quantity, yet the store of mineral food that we have in 6 or 12 inches of soil is so great that it is utterly insignificant in comparison with what remains.

Just so; the clover plants, undisturbed by the munching of cattle, keep up the continuity of action that is essential for root development, extend their feeding ground both horizontally and vertically; the flow of life sap, so needful for establishing health and promoting growth, becomes elaborated, and the 6 and 12 inches of soil, according as it may be stirred, teems with multitudes of roots; whereas, in

her case, the system is paralyzed, the
g ground is more limited, and both
anically and chemically the soil is in a
ligible state for the crop, which, under
circumstances, it would greatly benefit.
is certainly astounding, the quantity of
en that has been found in the soil of a
field after being seeded, and can only
plained upon some such principle as Dr
ker propounds; for, in the majority of
of plant living and reproduction, large
of nitrogen are drawn from the re-
s at command, and, but that we have
bundant testimony and sufficient prac-
proof in crops that follow it, would,
, be hard to credit. The learned Dr
ns the hypothesis as follows :—

> n we grow clover for seed, these leaves con-
> drop and enrich the surface soil; and if it be
> e, which I think is likely, that the clover tribe
> ts is satisfied with the ammonia which exists in
> osphere, we can at once account for the accu-
> n of nitrogen in the soil. The clover plants
> e nitrogen from the atmosphere and manufac-
> into their own substance, which, on the decom-
> of clover roots and leaves, produces abund-
> ammonia. In reality, the growing of clover is
> ent, to a great extent, to manuring with Peru-
> ano; that there is a larger amount of nitrogen
> lated in the first 6 or 12 inches of soil, than
> in the heaviest dose of Peruvian guano that
> son would think of using.

ning to a practical application of the
inculcated, we are met with no incon-
ble opposition. Not only every country,
ery county has its system of rotation
pping, and hence the difficulty in draw-
iversal attention to, at all events, insist-
on universal application of, the principle
ed. Naked truths are ill to gainsay,
ertain individual's calendar of opera-
re nearly as unalterable as the law of
ledes and Persians. In the south,
generally follows clover, and it is only
stion of grazing or no grazing that de-
the issue raised. In the north, there is
h thing as clover crops, *pur et simple*,
o attempt to revolutionize the mixed
of rye-grass and clover hay, would
o effect. Indeed, looking to the pro-
s an excellent pabulum for horses, and
fference in temperature north and south
of the Tweed, it would be little short of blind temerity for us to raise the question and insist upon action taken thereupon.

But surely there is nothing magical in the number of pounds weight of clover seed, as adopted by our Scotch farmers. Instead of 6 or 7 lb. per acre, it might be doubled, with no bad effect to the hay crop, and with certain benefit to the cereal crop that follows. Every intelligent farmer must indorse the practical value of the scientific investigations gone about and propounded by Dr Voelcker. Even in the matter of oats, which often in the north follows the lea stubble, the crop yield is in direct proportion to the amount of clover that has been growing among the rye-grass, conclusively pointing out the excellence of clover as a preparatory crop for the stronger growing of the cereals. Shutting out chemical analyses altogether, here we have direct presumptive evidence, which ought to weigh powerfully on the minds of every agriculturist and every farmer who farms with a view to profit.

Apart, altogether, from nation or county, climate or locality, upon a soil where wheat will grow and prove remunerative, there is nothing short of prejudice to hinder it being introduced in the rotation after a hay crop, be it pure clover or mixed with rye-grass, and it is proved, beyond question, in point of economy, to be both wise and good farming. It is high time for the press to speak out, when we are told by one of the best authorities that the chemical transformations which are going on in the decomposition of clover roots conduces to the well-being of the principal cereal, and that there is more certainty of growing a good crop of wheat in this wise than through a moderate supply of nitrate of soda. This may be an enthusiastic view, but that it tends this way, we take all agriculturists, other than chemists, who watch the tide of rotation and its sequences to witness.

A most excellent way of up-turning the soil and burying the mass of vegetation properly, is in the system of double-ploughing —one plough following another. The first skims the surface, and the second subsoils deeply. By this means the thin turfy layer is deposited topsy-turvey to the lowest level, consequently decomposition acts its part so well as to prevent a re-growing of such plants as are remarkable for vitality, and the manurial power is increased, and takes effect as the wheat rootlets approach it. Were a system of this kind well employed in many of our arable farms, it would increase their reproductive power at a minimum cost; but s long as apathy to the application of scienc as the handmaid of art is conspicuous, s long as science is held up in contempt amon *thousands*, we are sorry to say, of our farmer so long must they stand in their own ligh and hear of, if they do not see, the *hu dreds* of pioneers who give due attention t the advanced school of scientific researc profiting by giving effect to its code of laws.

ON THE INFLUENCE OF FLOWERING UPON THE YIELD OF POTATOES.

M. H. GILLIODTS, of the Administrative Council of France, has, during the last few years, experimented largely upon the cultivation of potatoes. The results of these have been published from time to time. The latest experiment which he made had reference to the point indicated in the above title, and the results of which have recently been published. Of these we make the following translation:—

In carrying out different researches upon the cultivation of potatoes, researches of which the results have been published, I have observed that several varieties bearing flowers have been less productive than those which had not flowered. This observation has engaged me to try a new experiment, so as to assure me if the difference ascertained was really due to the cause which I surmised.

The results which I have drawn from it, appear to me so significant and conclusive as to permit me to hold up as an excellent practice, the suppression of the floral organs in the potato.

It is, I believe, an efficacious and less costly means of increasing the production of the tubercles, without which there is a much greater expense for manure, nor so much injury to the soil. My experiments have been with the yellow potato, known in Flanders under the name of "Potato-nine-weeks."

The planting was in a dry soil, which suffered much from dryness at the beginning of the summer. This field, of a uniform composition to its full extent, was divided into two equal portions, which were planted at the same time, after having been equally manured; they were, besides, treated exactly in the same way, [illegible] the time of growth. There was a difference in this respect, only, that in one of the two portio we took off, with care, the flowers and buds, in pr portion, as they appeared.

This operation was renewed three different time first, when the greater part of the buds became easi seen, and then later, at short intervals, to get rid those flowers which passed unperceived the first tim

After the numbers gathered and given with all po sible exactitude, the expense of handwork which th requires, raises the hectare from 15 francs to 30 franc according to the rate of wages given to the workm you employ. This expense may be divided in t following manner:—1st visit, seven workmen duri two days will be fourteen days; 2d visit, four wor men during one day will be four days; 3d visit, t workmen during one day will be two days; altogeth twenty days. A little time after the taking off of t floral organs had been effected in the way I am goi to shew, upon one of the two portions of the fie experimented upon, the vegetation then took a markable development, comparatively to the oth left untouched. This superiority was maintained up the time of maturity; and even to the time of gath ing we could distinguish easily, by the thickness the stems, the plants which had been deprived their floral parts from those which had preserv them. On taking the potatoes up, the first ha furnished, in tubercles, 18,176 kilogrammes per h tare; and the second, 13,636 kilogrammes per hecta difference in favour of new plan, 45,000 kilogramm In valuing the tubercles at the rate of 5 francs o the 100 kilogrammes, we obtain, by the simple plication of this method, a superior value of producti representing a value of 225 francs, a sum from whi it is necessary to deduct the expense of hand w to a sum of 70 francs. Therefore, then, in the l analysis, a net benefit of 195 francs per hecta Seeing such a result, one is naturally led to a "to what is it necessary to attribute so great a' difference in the yield of the two portions of ground on a level?" Now, by the help of my observations, I believe to have discovered the cause, this question appears to me easy enough to solve.

At the end of the report which I presented to the Administrative Council in January 1857, I put down two conjectures in this way :—" Does there exist a perfect harmony in the development of all the organs of the potato tuber? or, better, a stoppage in the growth of the exterior parts of the plant? has it, in consequence, made the alimentary juice flow towards the underground portion?" Certain indications had made me present this last supposition as the most probable, and the most admissible; now, patent and incontestible facts oblige me to change my opinion.

In fact, in the experiment of which I am going to give an account, it is in the portion of ground where the potatoes have been deprived of their flowers, where the leaves have acquired a much greater development ; it was there also that the tubers were more increased. From this fact, should we not conclude, that, in the general rule, the produce of the tubercles is always proportionate to the strength of vegetation which the plant shews outwardly? That there is an intimate relation between the vegetative functions of the different organs of a plant, appears to me more doubtful. In the case which we are occupied with, the harmony which ought to exist between these same functions, explains itself perfectly well.

By the taking away of the buds, we preserve in the stem and leaves of the vegetable, the juice which would have gone to the formation of the flowers, and, later, to that of the berries and the seeds; because, as one has said (1), " The flowers are incapable of preparing nourishment for themselves, which they ought to receive in some other way." These juices, thus retained for the use of the vegetable, favour the growth of the leaves. Those offering them a more considerable surface, gain strength, not only in proportion to the faculty of absorbing the useful gases re-spread in the ambient air, but also in proportion to the reductive properties which play upon the alimentary substances not yet sufficiently worked out. From this superaddition of work in all the vegetable systems, there is a greater abundance of nourishment, and consequently an increase of produce. There exists, besides, another fact, which is, that in all the attempts where we have had recourse to the suppression of the leaves as a means of preventing an increase of the crop, we have always arrived at the very opposite result, which generally brought about to a diminution of produce of 11 to 17 per cent.

Such are the conclusions which have been drawn from a number of experiments, among those we will mention particularly MM. Anderson and Mollerat. If it is true that there reigns a perfect harmony between the outward and inward vegetation of the potato, we can no longer doubt the efficaciousness of the practice which keeps down the flowers.

But some will say to us, do we not notice that
potato often pushes itself with wonderful vigour ou
the ground, while, in the soil, it remains, so to spe
stationary? Without doubt, such is the case very
quently ; but this is only when the cultivation ta
place in anomalous conditions.

In admitting that the fruit of potatoes is found o
to the detriment of the tubercles, M. Dubrenil clai
that the increase of produce is the result of
suppression of the floral organs, and is so insig
ficant that it does not compensate for the expense
the extra work. (2.) On the other side, M. Gust
Heuzé, Professor of Agriculture at the Impe
School at Grignon, reports, in his work on for
plants, an experiment tried by M. Auberge, who,
an extent of 50 acres, gathered 150 hectolitres
potato tubercles, cutting all the flowers by means
the sickle, while upon the other half of the field, c
tivated by way of comparison, he obtained only
hectolitres ; the expense was not over the moder
sum of 2 francs. In this trial the superior value of p
duce, although of less importance than that whic
have stated, leaves, nevertheless, to the experiment
after the expenses being deducted, a good rou
profit. After having given this fact, M. G. He
added that, when we are able to cultivate anew the
late kinds, there is no doubt that we will recogni
with Bosc, the necessity of getting rid of the pot
flower.

Agricultural ameliorations are realised oftenest o
by great advances, either in hand work, manuring,
in implements ; these, it is true, are far from bei
unproductive, when they are made properly, and w
discernment. The method of cultivation which
recommend for the potato is easily carried o
In fact, there are neither costly implements to be us
nor any change in the general proceedings of cultu
nor great expense in manual work, nor the necess
for a greater amount of manuring. Now, there
there, you may see, many great advantages whi
speak in favour of the innovation put thus within
reach of all. Resting upon positive facts, gathe
upon the spot, I can only draw the attention of ag
culturists in general, and engage them in renewi
proofs which can be, for them, the beginning of a
miscalculation or any loss. Those who will decide
try by themselves the directions which I have giv
will do well to note that, to insure success better, it
necessary :—

1st. To try upon early planted potatoes, a circu
stance which permits of the tubercles acquiring a c
tain development before the disease sets in. 2d.
take off the flowers, or rather the buds, as soon as p
sible, so as to prevent the fixing of the nourish
principles necessary to the complete formation of t
floral organs. 3d. To proceed to the removing
these organs, without having recourse to the use of t
sickle, or any other implement—handwork being t
only thing for this, without incurring the risk
damaging the plant.

LARGE AND SMALL FARMS.

THE question of the comparative advantages and disadvantages of large and small farms, has, like almost every other subject, been frequently discussed, but never satisfactorily settled, nor is it likely ever to be so whilst the interest and views of one class, naturally enough, clash with the interest and opinions of others. The system of farming in one country has at all events been held up for imitation by other countries which could not be imitated under totally different circumstances, and it seems scarcely worth while to do much more than simply allude to such comparisons. On the one hand, the small farm system of Belgium and the Channel Islands, with fabulous crops, has been much extolled by the advocates—the strong advocates—of small farming, whilst the opponents to allotment farming have a strong case against small holdings in the general poverty and meagre crops of the French and Irish farmers, such small farms being but too well known as the most useless to the owner, the occupier, and the community.

With reference to English—to the size of English farms—there are, at least, three different interests to be fairly examined—namely, those of the landlords, the tenants, and the commonwealth.

English landlords are allowed every liberty to manage their property as they please. There are of course many opinions amongst the community regarding the various ways in which land is used, and not unfrequently there are complaints that both estates and farms are too large. It frequently happens, however, that many people advance their opinions without much just reason to support them. There are both public and private opinions about and against everbody and everything under the sun; therefore it need cause no surprise that land, so constantly before the eye, should be freely commented upon.

It will readily be granted by the people at large, that they feel their interest lies in that direction which allows them plenty of cheap food. Very few unconnected with farming would trouble themselves the least as o whether the food was obtained from large estates, arge or small farms; all that consumers want is cheapess and abundance, little matter how obtained. At ne time all the land was supposed to be held under he Crown, and was intended to be farmed for the best vantage to the community. There were grants of states by the Crown to individuals, also purchases rom the Crown; but in all cases the nominal owners of ne land had to pay either money, service, or some ind of acknowledgment, for the land, to the Crown. . such period of our national history there were few anufactures and scarcely any importation of food. [illegible] considered [illegible] property, and was intended to be farmed by the best system known, so that there should be plenty for both rich and poor. Under such a system, it seems farming was neither very profitable to the owners—who were then very frequently also the occupiers—nor to the bulk of the community. There were then meagre crops, frequent famines, and but too often coarse fare and little of it for the masses. It would be well for every one who complains now of the present system of managing estates and farms, to be conversant with the history of the past, to learn, as it were by past experience, that the system which many now advocate has been tried and found wanting. If a comparative failure then, it would be much more so now, as the extent of land has not increased, whilst the people have multiplied tenfold. At the time of the Norman conquest every person might have had 30 or 40 acres of land; now there are under 2 acres to every one. If, therefore, every one might have had such a large extent in those easy times, and could not then provide against periodical famines, how much less likely would any one be to thrive on such a mere patch as the country could now afford to every individual? It must have been a mere dream of the poet—

> "There was a time ere England's griefs began,
> When every rood of ground maintained its man."

It is quite a mistake to assume any such thing, nor is it at all supported by history and reason that *the good old times*, which many profess to mourn over, had ever any real existence more than the rood-of-ground theory. The higher and middle classes of the country are fully aware that the general luxuries and comforts of life are greatly increased, and more intelligence amongst the lower classes would shew them that their position is much improved also, instead of being in bondage, and living very frequently on scanty and coarse fare. There never was a time when the working classes had such quality of food as now, nor so many comforts. Labour is now better paid than at any former period. Mere physical employment, indeed, reaps as rich a reward, on an average, as the families of those whose occupation is mental, but still depending upon employment.

So far, therefore, as the community is concerned with the question of large or small farms, there is no evidence which can be brought forward in favour of small farms connected with antient times. Nor have modern times afforded many instances of success. The latest scheme of O'Connor's, for dividing the land into small occupations, although fairly tried to a considerable extent, utterly failed in the course of a few years. There are still estates and farms of very small extent constantly in the market. Such people as have an aim in life, who are intelligent, steady, and industrious, generally obtain what they reasonably want —born labourers even. When the object is attained it is also generally kept. But the case is different with discontented labourers, or others, who envy a supposed life of comparative idleness, and think the possession or occupation of a few acres of land the very object calculated to make them prosperous and happy without the slightest trouble. Such notions are dangerous delusions, and ought not to be encouraged by any one who knows better, but merely seeks to obtain a certain end by any popular means of agitation, which works upon the feelings of the ignorant.

To the masses it matters not one whit whether the land is farmed in blocks of thousands of acres, or in mere patches, so long as the products of the soil are obtained in the greatest plenty, at the least expense. Unless the productions are obtained at the least expense, they cannot be sold at a low rate for any length of time.

Many persons imperfectly acquainted with agricultural affairs just know enough to think they see much farther than others who may know more. It is well known to many that small farms usually let for more rent per acre than large farms. Then why, say those at the first glance, should land be farmed in large holdings when it would let for more money in small holdings? "The landlords must be blind—or, if not blind, something worse—to keep poor men from *enjoying* a bit of land." The answer to such comments requires a good deal of explanation. In fact, as landlords have it in their power to let their land as they please, the landlords must have ample reasons for the way the land is now managed. Still, although landlords have it in their power to let their land in any way they think proper, they must consult their interest by conforming a great deal to the condition of the country, as regards its population, commerce, and manufactures.

Ireland, for instance, with scarcely any of the people employed in manufactures, has a redundant population, which must subsist in some way. Small holdings are therefore the rule in Ireland, many of which are cultivated entirely by manual labour. Indeed, under the circumstances, it seems the best and most natural way of managing the land. Horse labour, consequently horse food, is saved ; so that if there were three men to a given extent of land, all of which must subsist it, it is better for all three to be employed, than one to be idle, which would be the case were horse employed to two men, as is a common eno proportion in England. In England, the people are not required for agriculture usually find o employments, and not unfrequently better occupations, as skilled labourers in trade or manu tures.

Skilled labourers engaged in manufactures, in receipt of good wages, would generally make a bad change by leaving their places and turning allotn farmers. As before stated, there are under 2 acre every one in England, or for a family, an ave family of about five persons, the proportion of l worth cultivating would be somewhat under 6 ac A family numbering five would find it a hard stru to exist on so small an extent of land, and would tainly be much worse off than by keeping to other better paid occupations.

There are many cases of market gardeners mak a good living on half-a-dozen acres of land ; but i quite right, indeed perfectly necessary, to rememl that were all the people to live on the land, t would be no market for anything ; every family w be producing its own food, and further, would hav produce its own clothes, build its own house, &c. barbarous ages this was exactly what was done, a most miserable job they appear to have made o Living in mere holes of houses, partially clothed the coarsest garments—such as the unpolished skin beasts—and making altogether a most precari existence out of land, although having in those ten times more extent for a family than could obtained now. Those who agitate for great alt tions in the management and division of land, h but a most superficial acquaintance with the subj Were English commerce and manufactures lost, t might be some decided reasons for much alteratio the present system of dividing and otherwise ma ing the land; but, in the meantime although much may be wrong, it would be a great evil attempt ever to carry out those extreme views w are from time to time advocated by the ignorant, the viciously discontented, who are for ever wan some great change, to have the chance of gras something valuable from others more industrious better off than themselves.

Farm Implements and Machines.

BOILERS AND BOILER EXPLOSIONS.

IT is an anomalous and much to be regretted fact, that although great progress has of late years been made in the construction of steam-engines for agricultural purposes, and the economical use of steam by working expansively, a corresponding advance has not been made in the construction of boilers. It is in the boiler that the subtle fluid which actuates the engine is generated; and upon its proper arrangements and proportions depends the economy with which the engine can be worked, and upon its strength and excellence of its workmanship depends the safety of the lives and property of those engaged at or near it.

In these days of active competition between all classes of manufacturers and commercial companies, when it is of paramount importance to reduce the expenditure by all safe means, surely this most important and necessary adjunct to the steam-engine is worthy of more attention than it at present commands from scientific and practical men. We believe boilers afford a large field for improvement, and if more science were displayed in their design and construction, we should have steam more economically produced, the public safety better secured, and a considerable sum saved in the cost of fuel.

From the endless variety of forms and proportions the immense differences in economy [illegible] failures [illegible] boilers at present [illegible] ent however impor [illegible] ignorant [illegible] designer of every [illegible] the simplest theoretical rules of his profession. Theory, in fact, is the greatest aversion of these men; the very name alarms them and they talk against it, as if a knowledge of the exact sciences was a dangerous and useless attainment. Nothing can be more erroneous than this impression, as, on a clos inspection, there is no practice without theory Theory is neither more nor less than a serie of definite rules by which practice is governed and through which we derive, from fixed an definite laws, those sound and definite result which, of all others, it is the primary object o practice to accomplish. When we see thes men ignoring all the laws of science, an merely depending upon chance, or impe fectly imitating a type which has been foun to answer well enough in some instance what can we expect but that their constru tion will be attended with failure?

The chief points to which attention shoul be directed when considering the plans an proportion of a safe and economical boile are, to distribute the material in the form i which it will effect the greatest resistance, t allow a sufficiency of heating surface, so a ranged that the steam may have free escap from the plates as it is generated; that th grate area be sufficiently large to admit th proper amount of coal being consumed wi thin fires; that the furnace be roomy, t allow the gases generated from the coal t mix and be burnt; and that sufficient tube flue surface, to absorb the heat generated i the furnace, be allowed.

As all these particulars are capable of bei practically ascertained, and are absolutely n cessary before the plans and proportions of boiler can be rightly determined, no m should be entrusted with the designing boilers until he is duly qualified to app them correctly, by having experience in t theoretical and practical laws of for strength of materials, chemistry of comb tion, and other requisites, to insure the ma mum of strength with the most economic working.

We may here go a little into detail, in ord to shew the great necessity that exists for adhering to certain rules of form, and other points of instruction, essential in the practice of mechanical engineers, in order to attain the maximum of strength with the minimum of material. In boilers this is the more important, as any increase in the thickness of the plates obstructs the transmission of heat, and exposes the rivets as well as the plates to injury on the side exposed to the action of the furnace.

It was, for a long time, generally supposed, and some still believe it, that the rolling of boiler plate gives to the iron greater tenacity in the direction of its length, than in that of breadth; this is, however, not correct, as a series of experiments, conducted by Mr Fairbairn, proved that there is no difference in the tensile strength of boiler plate, whether torn asunder in the direction of the fibre, or across it.

From five different sorts of iron, he obtained the following results:—

Description of Iron.	Mean breaking weight in Tons. In the direction of Fibre.	Across the Fibre.
Yorkshire plates .	25.77	27.49
Yorkshire plates .	22.76	26.37
Derbyshire plates .	21.68	18.65
Shropshire plates .	22.82	22.00
Staffordshire plates .	19.56	21.10
Mean . .	22.51	23.10

From this it appears that we may safely use iron plates in whatever direction may best suit the convenience of the maker.

Next to the tenacity of the plates comes the question of rivetting, or the best and surest means of fastening the plates together. On this part of the subject boilermakers had been widely astray, until Mr Fairbairn, by experimental research, discovered the real state of affairs. They had generally supposed the rivetted joint to be very superior in strength to the other parts of the plate, and at first sight this appears rather plausible, though a little reflexion will soon convince us that the joint cannot be the strongest. In punching holes along the edge of a plate, it is obvious the plate is weakened to the extent of the sectional area punched out, and as it is impossible to make up for this loss of strength by mere compressing the rivets, it is quite ridiculo to think that extra strength can be added the plate. In two different kinds of join double and single rivetted, the strengths we found to be in the ratio of the plate as t numbers 100, 70, and 56.

Although all these rules and proportio may be strictly attended to, the desi and workmanship faultless, it still mainly c pends with those to whose care the boiler intrusted whether it is safe or not. Ho many of the dreadful explosions which occ so often, spreading death and destruction, a solely attributable to *gross mismanagement the part of the attendants !*

In treating on this part of the subject, hope to shew not only what are the mo probable causes of explosions, but that whi appears equally important, what are not t causes.

The tensile strength of boiler plate bei so enormous (22 tons as an average), ma people are unable to believe that boilers a ever actually burst by steam pressure: ar looking at the destructive effects of these cidents, they at once assign them to t presence of some foreign explosive agent, su as the explosion of hydrogen gas, the g being produced by the decomposition of t water, electricity, or other causes equa abstruse.

The hydrogen theory is very popular, though it is quite impracticable. For befo water or steam can be decomposed into constituent gases, it must be passed ove red-hot metallic surface, at least 1000 d Fahrenheit, free from oxide, and of consid able extent. Except in a perfectly new boi this is at once impossible. Even in this stance, water could not continue to be composed for any length of time, because t surface of the iron must be in a metallic sta and when it becomes covered with a ve thin covering of oxide the decompositi ceases. If water were decomposed all, only one-ninth of its weight wou be hydrogen, the other eight-ninths bei oxygen, and this has to be absorb by the metallic surface before the hydrog can be liberated. It has been calculated that for every 3 grains of hydrogen 116 grains of oxide are formed; the amount, therefore, of hydrogen gas which would be evolved before the whole inner surface of the boiler became oxidized, would be quite inappreciable. Moreover, hydrogen is quite harmless by itself, and only explosive when mixed with its combining measure of oxygen, or 2½ times its volume of air; now, it is impossible for pure oxygen to be present, as it would be absorbed by the hot plates, and it is equally impossible to account for the necessary proportion of air. The only way by which air could be admitted into a boiler would be by entering in a free state along with the feed water. Now, ordinary rain water contains only about 2½ per cent. of free air, and considering the universal law of elastic fluids, that the space they occupy is inversely as the pressure, we find it would require not less than 25 cubic feet of atmospheric air to saturate 1 cubic foot of hydrogen gas at 150 lb. pressure; therefore, we think it is evident that a sufficient amount of air to form an explosive mixture could never be accumulated under any ordinary circumstances.

It is quite unnecessary, however, thus to subvert the science of chemistry to account for an explosion when the plates are red hot; for, from the diminution in strength of the metal by the heat, five-sixths of its strength being lost, the steam pressure that would be generated long before decomposition could take place, would be quite sufficient to burst the boiler.

GOODAY'S STRAW THATCH-MAKING MACHINE.

THIS machine, the invention of Mr Gooday, of Chelmsford, is well calculated to make straw or other suitable material into thatch, fitted for thatching stacks, or for other purposes. The straw is woven, so to say, into a web of uniform thickness and width. The thickness may be varied according to the purpose for which it is required, such as stacks, cottages, and outbuildings. The straw is laid evenly upon a table, at each side of which travelling spiked bands are fitted, and between which spikes the ends of the straw, or other stuff, are pressed, and as the material is moved forward by the travelling bands, it passes under a suitable sewing needle, and is bound, sewed, or stitched together, the edges being afterwards cut to give it a uniform width if required. The apparatus for stitching or sewing the straw which forms the thatch is constructed as follows:—The side standards carry a horizontal transverse shaft, which is termed the needle shaft. This shaft carries two or more eccentrics, which are capable of being adjusted or fixed at any desired part of the shaft above named. These eccentrics are fitted with rings or collars, which carry needles provided with the sewing medium. The needle or transverse shaft is turned by a crank or pulley. At the end of the shaft is fitted a rachet wheel and pawl, which move the rollers, carry the spiked band already named, which carries forward the straw to be woven or sewn together. The upper needles work through a transverse slot in the table, and are fitted with guides adjustable upon a transverse carrier, and the lower needles, with their respective hooks, are also adjustable. The lower needles are also fitted upon a transverse bar or slide for that purpose, their number and position being regulated thereon by that of the upper needles, as required. The double or multiple and adjusting needle machine, thus formed, may also be used for other purposes, such, for instance, as sewing together, at one operation, the two opposite edges, or edges and ends of any material for the formation of bands, sacks, or the like, or for such other purposes as it may be found available. We understand that this machine is coming rapidly into use.

Notes and Queries.

LXXXV. OUR WINTERS.

THE following facts, relating to our winters from 1833 to the present time, may not be devoid of interest to our readers :—

1833-4.—This winter was remarkable for its mildness, and for its literal absence of frost.

1834-5.—Up to the end of December remarkably dry and mild ; ponds and ditches dry.

1835-6.—Ten days' frost in the end of December and beginning of January, and some slight frosts in February ; but, on the whole, a mild, agreeable winter.

1836-7.—October 28th. Deep snow and severe frost. December 24th. To this date from the beginning of the month, continuous mild, wet weather. 25th and 26th. Deep snow, with moderate frost. End of January mild, with much rain. Heart cherries in full bloom on the 6th of May 1836, and Pyrus spectabilis on the 16th ; while the last was not in full bloom in 1837 until the 30th of May.

1837-8.—December very mild, the thermometer ranging between 50° and 55°. Roses and other shrubs shewing their young, tender shoots. January 6th. On this date a severe frost commenced, which, with slight thaws, continued until the 25th of February. Roses of most kinds killed ; evergreens, and peach, nectarine, and apricot trees, much injured. A severe winter, both as regards the animal and vegetable kingdoms. Nevertheless, in 1838, cherries were in full bloom on the 7th of May, and Pyrus spectabilis on the 18th of that month.

1838-9.—December mild and dry. January and February stormy, but no severe frosts.

1839-40.—November and December, incessant rain ; a week of pleasant, dry, but not severe frost, in January, and the same agreeable weather in February. Altogether a pleasant winter. In 1840, Pyrus spectabilis was in bloom as early as April 28th.

1840-1.—December 16th. Severe, frosty weather, which continued, with short intervals of thaw, until the end of February. March was, however, warm and fine ; but the winter, as a whole, was cold and unpleasant.

1841-2.—From June to December 25th, incessant rain ; meadows flooded all the autumn. December 30th, a mild April-like day, with frosty, calm, and beautiful winter weather in January. February mild and wet. In 1842 cherries were in full bloom on the 26th of April.

1842-3.—December mild and warm, with bright sunshine ; flies, and the common white butterfly, v active. January also a delightful month, mild a dry ; as was likewise February, in which, howev some seasonable frosts occurred. On the whole a f winter. 1843 was characterised by an early fruit-t bloom.

1843-4.—Between October and the end of Decem there was not a day's frost. On the contrary, weather was dry, mild, and agreeable ; and it c tinued equally fine all through January. Febru was stormy and wet, with frost occasionally. On whole, however, an agreeable winter.

1844-5.—From the beginning to the middle December there was severe frost, but the last half the month was mild, as was also January. Febru was frosty, as was likewise March, till the 22d. the former month there were 26° of frost, and in latter 24°. A severe and late winter.

1845-6.—December, January, February, and A all mild and agreeable. In 1846, cherries were full bloom on the 20th of April.

1846-7.—From the end of November to the mid of December severe frost ; a few days mild, and t frosty until the end of the month. January, from 4th, mild, but raw and disagreeable. February a March frosty. A cold and unpleasant winter. 1847, fruit trees came into bloom late ; even h cherries were not in full flower before the 6th May.

1847-8.—December mild and pleasant. A wind-frost prevailed in January up to the middle of month, the last part of which was mild. Febru was also mild and spring-like. A bright, enjoya winter. In 1848, fruit trees came early into bloom did also roses, blooms of Baronne Prevost, Mad Laffay, and others, having been gathered from t growing in an exposed border as early as the 14t May.

1848-9.—November and December, with the ception of a few days' frost at the end of the last-na month, mild. January commenced with a dry w frost ; but towards the end of the month, and through February, the weather was mild and spr like.

1849-50.—December very mild up to the 2 when a severe wind-frost set in, and continued w slight interruptions all through January. Febru mild, dry, and agreeable.

1850-1.—End of November and the whole of cember foggy and mild ; and, although a severe wi was prognosticated, the whole of January was rem ably mild with much rain, while February was mild, dry, and agreeable. On the 6th of the last-named month crocuses were in full bloom.

1851-2.—End of November and the whole of December dry, mild, and agreeable; paths dry, and ponds and ditches empty. January and February mild, with much rain.

1852-3.—December very mild and wet, scarlet pelargoniums in open borders being still untouched by frost. January also remarkably mild, as was likewise February up to the 13th, when a heavy fall of snow occurred, and frost and snow prevailed from this date to nearly the end of March, making the winter late and cold.

1853-4.—November and beginning of December cold, wet, and disagreeable, after which severe frost set in, which lasted to the 20th of January; the latter part of the last-named month, and also February, were, however, very mild and agreeable, inducing fruit trees to come early into bloom.

1854-5.—November and December dry and cold; ponds and ditches empty, and with the exception of a few slight frosts in the first-named month, no winter as yet. January, up to the 16th, mild, dry, and pleasant; afterwards frost set in and continued all through February, and often very severe, making the spring late, cold, and unpleasant.

1855-6.—November cold, foggy, calm, and dry; December, up to the 23d, alternate frosts and thaws; afterwards mild and spring-like. January and February, with the exception of some three or four days' frost, mild.

1856-7.—December set in with a week's severe frost; afterwards soft and mild. January commenced spring-like, then became dirty and uncomfortable until the 29th, when bright bracing frosty weather made its appearance for some days. February mild and dry.

1857-8.—November and December throughout mild, bright, and sunny. December 31st. Scarlet pelargoniums still in good condition in open borders; a dry wind-frost set in with January, which ended mild. The beginning of February was also mild; but from the middle to the end it was windy, dry, and frosty. Altogether an agreeable winter.

1858-9.—A few days' severe frost towards the end of November. December mild and dry, as was also January, during which month birds were in full song, and ponds and ditches dry. February throughout the same. In 1859 Pyrus spectabilis was in full bloom as early as the 16th of April.

1859-60.—November cold, with frequent frosts. December 14th to 20th, severe frost; thermometer at [illegible] weather, which lasted to [illegible] month. January very mild, the thermometer sometimes being as high as 54°. February set in mild; but after the first week frost continued to the end of the month. On the whole, a most destructive winter.

1860-1.—November mild, with much rain; December to 17th the same; on the 18th, frost set in; 25th, severe frost, with the thermometer below zer 30th and 31st, thaw. January to 18th, severe fros 19th, a slow thaw; 26th to the end of the mont mild, the thermometer being sometimes as high as 50' February mild and wet throughout. A ruinous wi ter, during which endless numbers of trees and shrul were either greatly injured, or completely killed.

1861-2.—November, with the exception of a fe days' frost about the middle of the month, favourabl December mild and pleasant. January mild an spring-like up to the 10th, when a week's fro occurred, after which it was mild to the end. Februar mild and dry, Pyrus spectabilis in full bloom on th 29th of April.

1862-3.—November, from the 12th, frosty, fogg and cloudy. December mild, and often sunn January mild, with heavy rains. February mild bright, and sunny. The old adage, that a mild winte generally precedes an unproductive season, was nc borne out in this instance; for the harvest of 186 was one of the most productive on record.

1863-4.—November and December both mild, an often bright and sunny. Severe frost occurred fror the 2d to the 12th of January, after which it was mil to the end. February to the 11th, severe frost; 12tl thaw and frost alternately to the end of the month.

1864-5.—November to the 14th, dry and cold ponds and ditches dry; from the 15th to the end c the month, mild and wet. December to the 17th mild; 18th, severe frost, and afterwards slight frost to the end of the month. January to the 12th, mil and dry; from the 20th to the end of the montl severe frost and snow storms. February to the 12tl mild; and from the 15th to the end of the month severe frosts and snow storms. Nevertheless, fru trees came into bloom early in 1865.

1865-6.—The mean temperature in November wa 44.8 degs., being 0.8 degs. above the average. Th rainfall was 2.04 inches. The mean of December wa 42.4 degs., being 2.1 degs. above the average. Th fall of rain was 0.90 inches. The mean temperatur of January was 42.6 degs., being warmer than an similar period since 1851; rain, 1.5 inches. Th mean of February was 40.5 degs., being 1.9 deg above the average; rain, 2.1 inches. An excessiv quantity of rain fell in October, 1865, and imped operations on heavy land. Wheat sowing was inte rupted. A sloppy November still hindered opera tions. A fine, hot, dry December allowed arrears c wheat sowing to be made up. Continued ope weather in January encouraged the growth of wheat Grass continued to grow. Heavy falls of rain i February retarded the tillage of land.

1866-7.—The mean temperature of November wa 44.3 degs., being 1.9 degs. above the average; th fall of rain was 2 inches. The mean of Decembe was 42.9 degs., being 3.8 above the average; fall c rain, 1 inch. The mean temperature of January wa 34.2 degs., being 2 degs. below the average. Th weather was very inclement up to the 22d. Th mean of February was 44.7 degs., being 6 degs. higher than the average; rainfall amounted to 1.7 inches. The weather was severe in January. Frost, with frequent falls of snow, lasted from the 1st to 22d January. A very low degree of cold was reached. At Croydon, in Surrey, 0.5 below zero was registered, and at Slough an equally low temperature was observed. After an interval of open weather, a frosty period recommenced in March, and prevailed for 23 days. The months of January, February, and March were not favourable for agricultural operations. The growing crops were damaged, and work impeded, especially the sowing of wheat, peas, and beans. Turnips, from being little valued in February, became, at the end of March, of the utmost consideration.

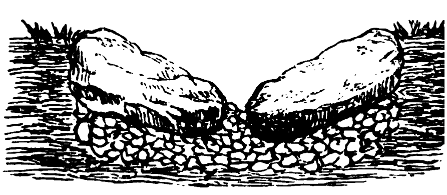
1867-8.—The mean temperature of November was 14.7 degs., being 1 deg. lower than average. The lowest temperature was 27.5 degs., the highest 64 degs., the rainfall 0.4 inches. The mean of December was 37.5 degs., being 1.6 degs. lower than the average. The greatest cold in the month was 21.2 degs.; the highest reading of thermometer was 55.2 degs. The fall of rain amounted to 2 inches. The mean temperature of January was 37.2 degs., being 1 deg. higher than the average. The greatest cold was 22.8 degs.; the highest temperature was 51 degs. The fall of rain amounted to 4.2 inches. The mean of February was 43 degs., being 4.6 degs. higher than the average. The greatest cold was 26.7 degs.; heat was 61.7 degs. Rain amounted to 1.3 inches.

1868-9.—The mean of November was 41.5 degs., being 0.9 lower than the average. The lowest temperature during the month was 26.1 degs.; the highest was 57.1 degs. The rainfall was 1.2 inches. The mean of December was 46 degs., being 6.9 higher than the average. The lowest degree of cold was 31.5 degs., the highest 57.8 degs. The rain was excessive throughout the country, varying from 5.5 inches to 7 inches, although the deficiency in rainfall during the season was great. The average was made up by the heavy falls at the end of the year. The mean temperature of January was 41.1 degs., being 4.9 degs. higher than the average. The lowest was 26.3 degs., the highest 55.9 degs. Rain, 2.9 inches. The mean of February was 45.3 degs., being 6.9 degs. higher than the average. The greatest cold was 31.7 degs.; the highest record was 61.6 degs. Rain, 2.3 inches. The mean of March was 37.5 degs., being 3.5 degs. lower than the average of the preceding 98 years, and 6.5 degs. colder than in 1868. The cold was 27.3 degs.; the greatest heat was 53.6 degs. Rain and snow amounted to 2.7 inches. Although March does not properly belong to the winter series, it has happened in two recent instances that the month has been more seriously inclement than any of the proper winter months, and in each case this has occurred after a mild and open February. In consequence of the absolutely forcing weather in February, 1869, vegetation was unusually forward. Crocus, scilla, and other early bulbs, were in bloom as early as the 7th; hawthorn was in leaf on the 15th; apricots in bloom 25th; while pears, plums, and cherries were ir advanced state. Wheat grew rapidly, pastures v full of grass, and the serious deficiency of hay, str and roots was less severely felt. Fair prospects these were changed. Snow fell on the last day February, and the weather throughout March ma tained a wintry character. Snow fell on 11 days, frost occurred on 12 days. Rendered sensitive by warmth of the preceding month, the early f blossom suffered greatly. Apricots were gener killed. The protracted cold acted as destructivel sharp frost, and covering trees will not obviate t Peach trees suffered a serious check, and bliste leaves and retarded growth is the consequer Wheat was damaged by cold and wet, and pastu were checked, and field work generally was v much retarded.

		TEMPERATURE.			
		Mean.	Lowest.	Highest.	Ra
1865-6	Nov.	44.8	31.0	56.4	2
	Dec.	42.4	29.2	52.7	0
	Jan.	42.6	19.6	50.2	1
	Feb.	40.5	15.5	52.7	2
1866-7	Nov.	44.3	26.5	59.6	2
	Dec.	42.9	27.7	56.3	1
	Jan.	34.2	6.0	55.0	
	Feb.	44.7	32.9	57.1	
1867-8	Nov.	41.7	27.5	64.0	0
	Dec.	37.5	21.2	55.2	2
	Jan.	37.2	22.8	51.0	4.
	Feb.	43.0	26.7	61.7	1
1868-9	Nov.	41.5	26.1	57.1	1.
	Dec.	46.0	31.5	57.8	5.
	Jan.	41.1	26.3	55.9	2.
	Feb.	45.3	31.7	61.6	2.

LXXXVI. A SMPLE GUTTER FOR FARMS.

On hilly lands, where the water, after a heavy ra or from melting snows, runs off with great veloci the following (from the *Albany Cultivator*) will found to form a cheap open drain:—Dig out a shall ditch 3 feet or more in width, and fill the bottom w small or broken stones, rounding them up somewl to within about 8 inches from the top. Then sel from the fields and old walls, heavy, flattened sto

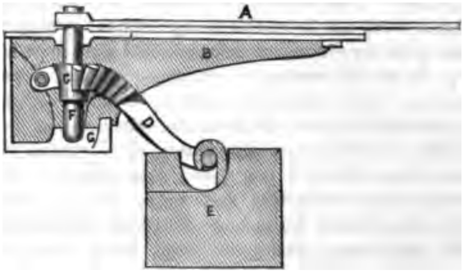


about twenty inches in length, place them upon t bed of small stones, side by side in two parallel row the ends nearly meeting in the middle. If one end a stone is thinner, place it inwards; if not, the inn end of the stone should be sunk in the bed, so that t two sides would form a channel somewhat like an op letter, V.

After the work settles into place, and the interstic become filled with gravel or growing grass, it will not be disturbed by the strongest current. Though its capacity may appear small, the velocity is so great that it readily passes the flood of our heaviest thunder storms. Laid out in straight lines, the plough runs close to its edge. The waters at its upper end are gathered by means of a few ridges of earth.

LXXXVII. COMPENSATION GATE AND DOOR-CLOSER.

A close observer of the "little ways of man," once remarked that he would divide humanity into two great classes, those who shut the doors behind them and those who did not; the latter class having very far the largest number attached to it; and stated that he would sooner entrust a man with the conduct of important business who did shut a door than the one who did not. Arguing that in the first case there was the evidence of thought and consideration, in the second the utter want of them. Like some other theories this appears to be, and may be, utterly fanciful, and would evidently apply only to civilized folks who have doors to their houses, not to those who have them not, or indeed houses at all; but the fact remains that so many people seem to forget what use a door is, or that a door exists, that it has become a necessity for those who have a "weakness" in believing that a door would not be put up if it was not to be closed—a weakness specially developed in the days when "wintry winds blow cold"—to adopt contri ances by which a door is made independent of the ai of man in closing itself. These contrivances are ve numerous, but many of them are apt to get out order, especially where springs are used. In the fo now before us, the invention of Messrs P. & J. Nimm of North Bank Street, Edinburgh, the spring is g rid of, and a counterbalance weight is substituted i the ingenious way shewn in the illustration. As th



door moves on its hinges opening, the pinion fixed o the vertical stand or spindle, F, engages with th curved rack or lever, D, and lifts the balance-weight E. On the door being released, this weight falls an brings back the door by the same means. We thin highly of this contrivance, and believe it will wor much more "sweetly" than the old-fashioned spring door closers.

Our Library Table.

The Book of the Landed Estate, containing Directions for the Management and Development of the Resources of Landed Property. By ROBERT E. BROWN, Factor and Estate Agent, Wass, Yorkshire. William Blackwood & Sons, Edinburgh and London, 1869.

IT is no disparagement to Mr Brown, nor to the labour of his pen, to say, when looking at the style in which this book ranges in the library with works as the "Book of the Farm," and others on kindred subjects, with which the honoured name of Henry Stephens is so happily and so usefully connected, that we cannot help giving expression to the wish that that name had also been found on the title page of the book now before us. It would have formed a fine finish to the literary labours of a life which has been devoted to the best interests of agriculture. We say that this is no disparagement to what Mr Brown has done, for he has succeeded in writing a comprehensive work, abounding in much that is, at the same time, particularly useful and suggestive; and, therefore, worthy of the purchase by those interested in making the most of the land which they possess, and to those also who are desirous to manage it well in order to know what its best interests demand, and the claims which those labouring on it have to their consideration, whether as landlords or agents. If we have a fault—and not to be critical is to be nothing—with the work, it is that it is too comprehensive, as it deals with subjects which, although in the strict sense of the term connected with landed estates, are, in practice, more directly connected with these departments which have been so fully treated of and so fully illustrated in the library of agricultural works, of which this work will, by the public, be supposed to form a part, issued by the same publishers. Not that what Mr Brown says on the subjects so discussed is not worthy of attentive perusal. Far from this; but had reference been made in connexion with them to the works alluded to, more space would have been at the command of the author to dwell upon those subjects of the greatest importance, which are directly and closely connected with the scope of his work. We regret that this has not been done, all the more that Mr Brown has said what he has had to say on such direct subjects so well, that we wish he had said more.

As may be supposed from the title of the book, subjects are discussed which have not seldom been discussed, and opinions are given on points about which there has been and will always be a great and marked diversity of opinion; and it is no small praise to our author to say that, on such subjects where there is such a strong temptation to broach extr
opinions, which would necessarily have disple
many, he has succeeded in stating his views i
manner which, while not failing to express an ho
and decided opinion, is yet characterized by
prudence and fine feeling which will give off
to none. Take, for example, the question of la
lord and his duties on the one side, and those of
farmer and the estate agent on the other, Mr Bro
while fairly and fully pointing out the duties of
gives due prominence to their merits as classes.
will not be supposed to be of those who, to c
favour with the farmer, proceed to find unmitig
fault with the landlords, or *vice versa*, and yet
fully agree with the author that landlords have du
to perform which they sometimes neglect, and to wh
they should direct the results of a special educati
On this point we take the following. After pointing
certain defects in British farming, Mr Brown s
that the remedy for this is to be found in the

> "Heirs to landed property subjecting themselve
> an agricultural education. 1st, By availing themsel
> of the advantages offered by such institutions as
> Royal College at Cirencester, where scientific
> artistic agriculture is taught; and 2d, by spending
> or three years in a home farm, or with an intellig
> and advanced farmer, so as to become acquained w
> the practical part of the profession. Such a train
> as this would qualify him for discharging the du
> devolving upon him as a proprietor with advant
> both to himself and his tenants. Unfortunately,
> majority of landowners when they succeed to the
> perty are completely ignorant of the requirement
> rural life into which they are at once plunged; a
> as a matter of course, they entrust the entire man
> ment of their landed property to an agent or fac
> generally a solicitor, whose principal object will b
> exact as large an income from it as possible, and
> pending as little as will suffice to keep th
> together."

We scarcely, however, go the length of saying v
Mr Brown that all the blame of bad managemen
estates rests with the proprietors. Surely a littl
just a "very leetle"—rests with farmers also. O
it true that there are no bad farmers amongst
We wish we could answer this in the affirmative.
to farmers themselves, Mr Brown has the foll
ing:—

> "The farming class includes men of every imag
> able description and reputation, from the m
> honourable and upright, down to those who wo
> not hesitate to take every kind of advantage of th
> neighbours, when they could find a safe opportu
> of doing so, and thus taking farmers as a class, th
> are few, in comparison to their numbers, who h

made rapid strides in the improvement of their farms, and who occupy, consequently, a high standing in their line of life. This is no doubt owing partly to the want of proper training and education, whereby their minds can be made to comprehend the advantages arising from superior modes of culture; partly to the want of sufficient capital to enable them to carry out farming on better principles; and perhaps partly to the fact that, generally speaking, the beef, mutton, and grain belonging to the man who rears them in the ordinary way, meet with as ready a demand in the market as these commodities do when reared and sold by the improver, the difference in the profits lying more in the quantity than in the quality—of course, all other points being equal. Generally speaking, however, farmers, as a class, are acute in respect to their own interests, and in so far as their intelligence and means enable them they make the most they can of their subjects. For the most part I have found them inclined to enter into such arrangements as were suggested by the proprietors for the improvement of their subjects, when the schemes were likely to turn out advantageous to the interests of the farmers in the first place, and to the proprietors as well in due course. In short, having had a considerable experience among farmers in the way of carrying out improvements in many parts of the country, I have seldom found the younger and more intelligent part of them insensible to the advantages of superior modes of culture, nor unwilling to introduce these on their farms where the proprietors have been at all liberal in dealing with them. Generally speaking, and with some exceptions, even where farmers are inferior in intelligence and possessed of but small capital, if they are liberally dealt with, and under the direction of liberal landlords and judicious agents, they may be made to carry out and follow such a system of cultivation on their respective farms as it will be found highly conducive to the interests and prosperity of both landlord and tenant."

Coming between the landlord and the farmer is the estate agent, and Mr Brown devotes some space to a detail of what his duties are, and what his qualifications should be. What should be his *personal* qualifications are thus stated :—

"He should be of a cool and calculating turn of mind; never acting without calm consideration as to the probable results of all he possesses or undertakes in relation to the business of his employer. He will find, on most estates, farmers who are as well able to judge of agricultural matters as he is, perhaps more so; and if he give them a hasty and inconsiderate opinion in reference to any matter, it cannot fail to damage his reputation, not only in the eyes of the tenants generally, but also in the estimation of the proprietor. He should never be one-sided in his dealings between landlord and tenant, but act in the fairest and most candid way possible between them. In order to insure his dealing fairly between the respective parties, he must have a clear judgment in regard to everything he engages in; as, if he has not this qualification, he is apt to lean to the one side or the other, as it were by chance, and without being able to give a reason for it in his own mind. Clearness of judgment and decision of character form high qualifications in a land agent, as without them nothing can go on well under him. He should have a considerable amount of patience and frankness, combined with acuteness, in order to enable him to deal wit the different characters of men, such as are to b found among farmers and tradespeople generally in th country. In dealing with farmers, especially, he likely to find many of them of antiquated habits an ideas; and unless he can reason them out of such i a patient, cool, and happy manner, he will not b able to command their respect, or induce them t listen to his advice."

An important book such as this cannot, or shoul not, be dismissed with a brief notice such as the pre sent. We therefore propose to return to its review meanwhile, we conclude by giving the following e tracts on two important points connected with lande estates from the work, and by strongly recommendin its purchase and careful perusal to all interested in th progress of agriculture. The first of the extrac above alluded to is in connexion with leases; th second upon the bringing in of our waste lands int culture :—

"With regard to leases, my opinion is that n educated and skilful farmer, having abundant capit for the proper working of his farm, should be restricte under heavy penalties to a certain mode of croppin from which he dare not depart under any circumstance but he should be bound to keep up a high state fertility in the land he may occupy, and thu far only, viz. :—*That he is to maintain his lan in the highest possible state of fertility, and to keep it pe fectly clear of weeds, at all times during the currency his lease.* With a well qualified class of tenant having ample means at command, there would be n further restrictions found necessary, as their ow interest would lead them naturally to attend to this. Wit poor, ignorant, and unskilful tenants, however, the cas is very different. One thing seems clear in regard to th practice of restricting farmers in their leases to certai modes and rotations of cropping—to wit, that if lanc lords continue to enforce these restrictions they wi get only inferior tenants to submit to them, as it is n to be expected that any really independent and wel educated man will submit to be tied down in the wa indicated by the letter of the leases in general use. should, therefore, be a matter of serious consideratio with proprietors how far they can secure an improve ment in this respect when letting the farms on the estates. Many think that it is superfluous to talk ever bringing the great proportion of our waste lanc into such a state as to make them of much mo use to the people than they are at presen This, however, is an error, as has been tested suff ciently in several districts. It is a matter of ver great importance to us as a nation, to consider the be ways and means of improving our waste lands, so they may assist in supplying food for the use of gradually increasing population. It must be a que tion of vast import to all thinking people, when w consider that in Great Britain (with Ireland) there a upwards of 30 millions of people depending upon th produce of the land for their support, and nearly millions of men are kept in employment by agricultur . . . .The population of Great Britain in 1848 was millions, thus shewing that it is increasing fast. T get a supply of food we have to depend a great deal o supplies from other countries. . . . It would be great advantage if we could make the British so support the British people."

Descriptive Hand Atlas of the World. By JOHN BARTHOLOMEW, F.R.G.S. Dedicated by permission to Sir Roderick Impey Murchison, Bart. Parts I. to IV. A. Fullarton & Co., London and Edinburgh.

WE have pleasure in directing the attention of our readers to this Hand Atlas, which combines the various excellences of utility, cheapness, and beauty of execution, both in the maps and the letterpress. A very good feature is introduced, and carried out with excellent judgment—namely, adjusting the scale to which the map is constructed to the importance of the country, the geographical and local position of which it illustrates. This is a vast improvement upon the plan hitherto universally—with few exceptions—carried out in getting up Atlases, in which a uniform scale is adopted, thus giving the same amount of space to a country of the greatest, or, perhaps, the highest importance, which is given to a portion of the surface of the globe of a comparatively unimportant character. Another feature, and it is a valuable and suggestive one, is also introduced, and this is, giving the names of places in the case of foreign maps, not only in English, but those known to the inhabitants of the country in which the place is situated. Thus, it is more th interesting, it is a particularly useful thing to kn that Vienna, for example, is known to its inhabita as Wien ; Treves, as Trui ; Mechlin as Malines, &

Did space permit, we could also refer h to other features of value which have b introduced into this Atlas ; but we have s enough to shew that no ordinary degree of c has been given by the editor to make it what it p fesses to be, a thoroughly popular work, contain the elements of utility, cheapness, descriptive infor tion, facility of reference, and excellence of executi One word, in conclusion, as to the latter point, with special reference to the maps. We cannot pra too highly the style in which these are produced ; only are they most carefully engraved, but the colo ing is effected in a peculiarly happy and elegant w This, in many atlases, is a perfect eyesore, from glaring vulgar colours adopted to define the separ departments ; doubtless this is done to insure disti tiveness ; but in the Atlas before us, the publishers h shewn how the utmost distinctiveness can be secu with the highest degree of quiet and elegant tast the choice and arrangement of the colours.

The Garden.

THE FRUIT CROP OF 1869.

OUR newly-fledged contemporary, the *Seedsman and Nurseryman*, says:—

"It is always precarious to estimate at this time of the year the probable yield or weight, or rather bushels, of the orchard produce of the country. Our climate is so fluctuating—so many alternations of heat and cold, drought and moisture, again influenced by the current and character of the winds—that often a propitious harvest of blossom is unaccompanied with a proportionate return of fruit. A scorching sun and chilling wind, if low night temperatures prevail, deal a death blow, from a utility point of view, to the thousands and millions of stigmatic surfaces that stand exposed to their united influences. Charming and beautiful as a bride at the altar, though each individual we see may be clothed in matchless robes of white, from an utilitarian or reproductive point of view, all that dress is only acting a subsidiary part, as every orchardist and every careful observer must know. What we are all concerned about is the protection of the stigmas until the formation of the fruit is accomplished. This once done, and then the first and greatest danger is past. Of course Nature will relieve itself of an unnecessary burden, and hence the reason why so many miniature fruits drop off in babyhood. Then comes the stoning period, and with it a number of others succumb, but, as a rule, after fruit is fairly and generally set it is practically safe. So far we have not only had a delightful but a highly propitious season. But we have had more than that, for with that only, without regard to collateral bearings, we could have no success. We have had a most propitious autumn. The [illegible] ripened [illegible] [illegible] the highest degree practicable, and both fruit and wood buds have been engendered of a kind capable of serving the highest ends which the most ambitious magnate could demand of Pomona. What comes for us now to consider, and which every reader must be anticipating, How about the prospects of the fruit crop of 1869?

Fortunately, we are in a position to speak with more than ordinary confidence, for our observations are not taken from a single orchard, or a single shire, but from personal inspection over a large portion of the length and breadth of England. As a rule, there is a great abundance of blossom on all kinds of fruit trees. Around London, in the counties of Middlesex, Essex, Surrey, and Kent, the orchards and gardens are one of the finest sights any Londoner could see. Pears and cherries particularly look as if robed in snow, scarcely a point of relief being visible in their contours. Apples are bristling with buds, and the earliest of them in equal richness of inflorescence. Plums, where cultivated, shew, or have shewn, equal floral grandeur. No matter whether in the hands of our best cultivators, such, for example, as at Chiswick, where trees are grown upon the best principles for ensuring, or at all events commanding success, or at some of the older fashioned styles of market gardening or orcharding, where trees are lichened with age, and only pruned in a moderate degree, they each rival one another in point of floral effect. Rows and rows of them pass under review, and all seem quite unexceptional. Of course, some sorts of both pears, apples, and plums are not so proliferous as other sorts, but all are adorned in their best style.

Nor are the midland counties, comprising the shires of Hertford, Bedford, Northampton, and Leicester, or at least such portions of them as came under review, where orchards are to be seen, one whit behind in auspicious prospects. The farther north we travel, through Derbyshire, Yorkshire, and the northern counties, the same sights are visible. Even in such districts where coal pits and iron works stud the surface of the land, enveloping the atmosphere with a hazy dimness from the quantities of smoke that roll out in volumes and disperse in all directions, there are little gardens visible, with their stunted-like apple trees yielding no little quantity of blossom. In truth, it is a year almost unprecedented for fruit-tree blossom. Coming into Scotland, and really "crossing the Tweed," we have the same story to tell. Berwickshire, Haddingtonshire, and the Lothians are in the same respect as to the small gardens that have but ordinary skill to prune and manage them; and then the great orchards of the Clyde in Lanarkshire, and of the Tay in the Carse of Gowrie, are, or promise to be, as beautiful objects of their kind as ever eyes looked upon.

We have, therefore, had a rich feast of fruit-tree blossom to look upon, and if auspicious weather continues, it will be difficult to estimate the number of thousands of bushels of fruit that will be gathered in our own country at the harvesting season. What a boon of itself this would be to our teeming population! There are such a variety of ways that apples, for instance, can be served to be palatable, and, at the same time, cool and nutritious to the system, that it is highly desirable to see them within the province of the means of the poorest of our population. The Scotch peasant does not seem to attach the same value to the apple as an auxiliary to the dinner table as his brethren a little farther south. Give the one a lot of apples, and their families will munch them up without any preparation in the way of cooking. Give the other a quantity, and a very different account is given of them, in the form of a seasonable article of diet. A little reflexion at once shews which is the better way. Let us, therefore, hope that auspicious weather may continue, and that the fruit crop of 1869 will be all that we anticipa for it.

So much for early promise. How oft have we seen a brilliant morning succeede by an indifferent afternoon! and in a som what similar position stands the fruit crop 1869. The blossom was most abundant, a everybody predicted a good fruit year; bu unfortunately, these predictions have n been by any means verified. Apples, pea and plums have, in some localities, be damaged by hailstorms, more especial apples, which were then setting. The d brilliant weather of last year was most vourable for wood-ripening, an importa point with reference to fruit production; b on shallow lands overlying dry subsoils t excessive heat and drought proved too mu for the trees, which, in some cases, were but burned up. Then, when rain came, the autumn, they pushed out afresh, an eff made at the expense of this year's crop.

Peaches and nectarines are in most plac a failure, a circumstance doubtless attrib able, in a great measure, to cold, dan weather—which was prevalent during t time the trees were in bloom—and to gene want of vigour after the tropical summer last year. Actual frost, we apprehend, cept in some few places, has had little to with the matter.

Apricots are also a thin crop, and, as t trees suffered a good deal from the scorchi sun of last season, some are afraid that ma of their branches will die off as the seas advances. During March, the tender bl soms, in some localities, were subjected severe storms of sleet and rain from t south-west, and, though protected with verings, the bloom got wet; and frost, duri the middle of the month, injured the fi blossoms. The question therefore aris taking the expenses of protecting materi so often required, and the labour and atte tion of covering and uncovering, as at prese done, into account, would it not be go policy, and pay those to whom the loss of crop of this delicious fruit, as well as peaches and nectarines, is of great i portance, to erect glass cases, in which t bloom and tender fruit would be safe from cutting winds and spring frosts? In many establishments such glass cases are now to be found, and the result is invariably good crops of finely matured fruit.

The pear crop, on the whole, is satisfactory. True, it is somewhat deficient in Nottinghamshire, Northamptonshire, Hertfordshire, and Cornwall, where it is said to be almost a failure on standards; but in other districts it is tolerably good, except, perhaps, in the case of late varieties, which, in Durham, are reported to be partial. Pear trees suffered a good deal last season, especially those on the quince. The earlier sorts of pears on dwarf standards, and on east and south walls, promise to yield fair crops, but orchard fruit in places is thin. The sorts which appear to be most prolific are Green Chisel, Marie Louise, Louis Bonne, Duchesse d'Angoulême, Ne plus Meuris, Colmars, and a few others. Many sorts that are hardy generally, such as Bergamottes, Beurré Diel, Easter Beurré, Winter Nelis, and even the well-known baking Pears, such as Catillac, Verulam, and Vicar of Winckfield, are very uncertain this season.

Apples, though improving, do not appear to be over plentiful, and in many places what otherwise would progress favourably, are suffering from the attacks of grub and green fly. In some places the cold nights which we have lately experienced seem to be affecting them, as many of the young fruit look yellow, and likely to fall. Trees which bore well last season have in some cases nothing on them in the way of a crop this year. Our Blenheims, Ribstons, Norfolk Beefings, and other good bearers generally, are by no means laden with fruit this year. Short supplies, therefore, and comparatively high prices, m[illegible] expected.

Plums a[illegible] reported to be under an average [illegible] except in Buckinghamshire, where they are good on standards. In Suffolk, too, they are promising; but are reported to be much infested with green fly; and in Hertfordshire and neighbouring counties there is said to be a fair supply. In Durham, green gages are a failure. Damsons promise well in Her fordshire.

Cherries, though under an average in som places, are, on the whole, fair crops. I Suffolk they are stated to be most abundan but black fly is reported to be very troubl some. Morellos are seldom known to fa on north walls; this year they are more tha usually abundant.

Figs, where grown out of doors, are good but the almost wintry nights which we hav lately had have been very unfavourable t them, quite killing, in some instances, th young fruit.

What is termed "soft fruit," is, in genera most abundant; but currants, especially i Suffolk, are badly infested with green fly. I Yorkshire, gooseberries are reported to b but middling; but in Cornwall they a said to be a total failure. From other countie however, we hear better accounts of them and, upon the whole, they may be pronounce to be a fair crop. Strawberries have set wel and only want plenty of sunshine to brin them to perfection.

The subjoined report will shew how matte stand in reference to particular counties:—

BUCKINGHAMSHIRE.—Peaches, Nectaries and Apr cots, but a third of a crop. Plums thin on wall good on standards; pears on walls fine; apples indi ferent; raspberries, strawberries, currants, and goos berries, good. Figs on walls, fine. Mulberries als good.

CORNWALL.—Figs.—The mildness of last wint was very favourable, and these are now shewing a abundant crop. Peaches and Nectarines.—In som places a good sprinkling, yet there are many localiti more exposed that have scarcely any. This, of cours refers to out of doors. Pears.—Average crop o walls. Standards almost a failure. The latter kin of trees was literally covered with bloom, but fe pears are seen. Plums.—A very inferior crop. sprinkling in some places where situated low. Stra berries.—These have been much later than usu owing to the prevailing cold during the summe Gooseberries.—In some places a total failur while in a few nooks there are plenty. Cherries.- Early ones half a crop, late average. Apples.- Not yet all "set," but every appearance of a goo crop.

DORSET.—Gooseberries, Currants, and Raspberri are abundant. Strawberry plants are extra fine, an in grand bloom. Apples are a very short crop. Pear both culinary and dessert, are satisfactory. Peaches and Nectarines are very scarce. Apricots have dropped all their fruit. Plums and Cherries are a short crop. Though they set well, they have not swollen off well. The best crop of Cherries is on Guigne tres Precoce, Early Lyons, and Napoleon Bigarreau. They are very excellent sorts. A mild winter is never conducive to fruitfulness. A dismal account prevails on all sides.

DURHAM.—Apples as yet uncertain. The bloom was abundant and very strong, but the trees are at present a good deal infested by grub and green-fly. Apricots good. Cherries: early kinds good half crop. Morellos and others not certain. Peaches and Nectarines all under glass, and an excellent crop. Plums of all kinds almost a failure, especially green gages. Pears: early kinds very good. Later partial. Strawberries: much under average, and a good deal stunted. Bush fruits of all kinds good light crops.

ESSEX.—This year fruit crops with us will be rather short. Apricots and Peaches on walls are almost a complete failure; Pears on walls, and also on standards, will be a fair crop; Apples will probably not be half a crop, and the same may be said of Plums; Gooseberries and Currants are good; Strawberries middling; Raspberries bid fair for a good crop; Morello Cherries are very good.

GLOUCESTERSHIRE.—Apricots and Peaches a complete failure. Pears, in most cases, a full crop. Plums nearly a failure, whether as regards trees trained against walls or open standards. Apples very partial, unless on some of the hardy varieties. Cherries about half a crop. Bush-fruit abundant. Strawberries a full crop.

HEREFORDSHIRE.—Fruit crops with us are a failure this season. Peaches on walls are next to none, and Apricots are not much better; Apples shewed blossoms kindly, but insects since have played sad havoc among them, so much so, that with some there will be a poor crop. Pears are good, and Strawberries promise more than expected at one time; Morello cherries will be good, that is, if they stand; other sorts thin. Plums shewed well, but they are nearly all gone; small fruit a fair crop. The peculiar season has even extended its influence to Peaches within doors, so that where some should have had forty dozen, they have only ten. We are surrounded with Apple orchards, some of which are sadly blighted but this may not be general.

HERTFORDSHIRE.—Fruit crops in many instances with us are an entire failure. Apricots are very scarce; Peaches and Nectarines nearly equally a failure; Cherries and Plums not over plentiful, but still a fair crop; Pears and Apples on orchard trees very thin; Figs very promising; small fruits plentiful.

LINCOLNSHIRE.—Apricots a good crop where well protected; a complete failure where not protected. Apples will be a very poor crop, although their appearance when in bloom was very promising; fruit did not set. Pears a fair crop on most varieties.
Peaches a complete failure, although promising whe
in bloom. Nectarines a failure, although they bloome
well. Plums under average. Cherries the sam
although both these and Plums bloomed well. Amor
Strawberries, Garibaldi, Mr Radclyffe, Eliza, Prin
of Wales, Trollop's Victoria, and others, are shewir
well for a full crop; but British Queen, Sir Charl
Napier, Lucas, and Keen's Seedling appear to be
failure. Raspberries will probably be a poor cro
canes very weak, not having recovered the last season
drought. Gooseberries a good crop; red and bla
Currants the same. On the whole, it will be seen th
we have but very poor prospects of fruit crops, a ci
cumstance the more disappointing as we had such
abundant bloom on all kinds of trees. The seas
with us has been unusually wet and cold, whi
accounts for the blossom not setting.

NORTHAMPTONSHIRE.—Apples here will probab
be about a third of a crop; Pears one-half; Cherri
good; Plums half a crop; Apricots one-third; a
the same may be said of Peaches and Nectarine
bush-fruit fair; Strawberries good.

NORTHUMBERLAND.—Peaches and Nectarines e
cellent crop; trees clean and healthy. Apricots ve
good crop, and trees in good health. Cherries go
average crop. Plums very few. Pears average cro
Apples, with very few exceptions, abundant. Stra
berries in bloom, and likely to be a good crop. Fig
none grown out of doors. Small fruits abundant. Nu
very few.

NOTTINGHAMSHIRE.—We will, we think, ha
nearly half a crop of Apples and Pears, and a go
crop of Plums.

SUFFOLK.—Peaches and Nectarines almost a failur
Apricots thin; Pears promising; Plums satisfactor
Cherries most abundant; Apple crop suffering,
some extent, from cold at night; Bush-fruit mc
abundant; Figs affected by the cold nights whi
we are still experiencing.

YORKSHIRE.—Our fruit prospects in this part of t
country are much better this season than at one tir
they were expected to be. Apricots were in blosso
early in March, but many of the flowers were we
and imperfect, and fell off without setting. T
weather during the whole time they were in blossc
was dull and cold, and sometimes boisterous; b
after examining the flowers, there was little dou
that their being weak and imperfect was the cause
their falling off without setting, and not the weath
The crop, on the whole, is only moderate—rath
below an average. Young trees have most fruit
them. Some young trees on walls are heav
laden, but some old trees have a thin crop. Peac
and Nectarines shewed an abundance of bloo
but, like Apricots, a deal fell off in some pla
without setting, though the weather was favo
able all the time they were in flower. On light sc
the trees suffered much last season from the long c
tinued heat and drought. On strong cool soils
trees stood the heat well; and in places of this

scription the crops of fruit are good this season. Here peaches have set remarkably well. On some of the trees there was five times more fruit than was necessary for a crop. Pears are an abundant crop everywhere, both on wall and standard. Plums shewed a fine bloom, but the crop is below an average one. The crop of fruit last season was remarkably fine and abundant, which is the chief cause of the crop this year being a light one. Certainly the weather had not caused it, as it was fine the whole time the trees were in flower, much finer and more favourable than it was last year during the time the trees were in blossom. Some kinds, as the Jefferson, Victoria, and Mitchelson, rarely fail to bear a crop, except when they have been allowed to carry an excessively heavy one, which is sure to be followed by a deficient one. Here, Washington, Kirke, Jefferson, Goliath, Pond's Seedling, Victoria, &c., have a fair sprinkling of fruit, but still much below an average. Cherries are most abundant. Apples are a fair crop, but below an average; still much better than was expected, the crop of last year being an excessively heavy one. There was much more blossom everywhere than what was required. No doubt the fine hot weather of last summer, so favourable for the maturation of wood and formation of flower buds, was the cause of so much bloom, notwithstanding the heavy crop the trees bore. Here, some old trees of Keswick Codlin and others that had heavy crops last year have few or no fruit, but most of the other trees have fair crops, and some of them heavy ones. With the exception of Gooseberries, bush-fruit is most abundant. Currants of all kinds are heavy crops. Raspberries are good, notwithstanding the plant having suffered much on light soil from drought last season. Gooseberries are, on the whole, a thin crop, much below an average one. The very mild weather which prevailed throughout February brought them early into bloom, and the cold strong winds, which more or less prevailed for several weeks afterwards, did much injury to them. Ashton Reds and Whitesmith are mostly grown in this neighbourhood for market. The Ashton Reds were early in bloom, and suffered much, and are a thin crop. The Whitesmiths were later in coming into flower, and are a better crop. Strawberries will be a fair crop in most places, but at one time it was thought the crop would be very deficient. On light soils the plants suffered very much last season from drought, and the rains came too late for them to form and perfect good crowns; the consequence was, the flower stems and trusses at the beginning of the season appeared very weak and unpromising, but the fine rains we had at intervals throughout May improved the plants wonderfully, and brought up the trusses well. In this part are some British Queens well flowered, of remarkable size and vigour; also Sir Joseph Paxton, President, and others. Had dry weather prevailed throughout May, the crop would have been a very light one; but as it is, except on light soils, the crop will be an average one. When we consider how excessively heavy the crop of fruit was last year, how the trees suffered in light soils from the drought, how forward everything was brought by the mildness of the winter, and how cold and boisterous the weather was from the end of February to the beginning of April, we may well feel satisfied with the fruit prospects of 1869. Let us recapitulate: Apricots are a moderate crop; Peaches and Nectarines an average one; Pears will be plentiful; Apples will be a much better crop than expected; Cherries are an abundant crop; Plums will be a thin crop; bush-fruit, except Gooseberries, abundant; and Strawberries a fair crop.

One word of advice to beginners. Attend properly to the thinning of the young fruit, and to summer pruning. If you do this, you may reasonably expect fair crops of fruit the following season; but if you neglect this at the proper time, never thinning any of the fruit, and never stopping or thinning any of the young wood, you may expect failure and disappointment the following season.

MESSRS LOW'S NURSERY AT CLAPTON.

OF all the Nursery establishments in the neighbourhood of London, this is the one *par excellence* to which the name "plant manufactory" best applies; for here plants of all descriptions are either raised from seeds, struck from cuttings, or imported in such surprisingly large quantities as to confirm the assertion just made, and after being grown to a certain size, they soon afterwards find their way into other establishments. Few of what are termed specimen plants need, therefore, be looked for in a manufactory of this kind, in which the chief aim is to raise or import, and to sell with as much expedition as possible. The place is literally covered with glass, which, for the most part, is in the form of span-roofed houses or pits, range after range running parallel with each other, till persons become as bewildered among them as if they were attempting the exploration of a maze.

The specialties of this establishment are, ls, heaths, and hard-wooded New Hol- plants; but of such soft-wooded stock as goniums there is also abundance, whilst s of the silvery-leaved Centaurea com- , Statices, and tree carnations are struck, made into nice growing plants with erful facility and expedition. The last, lly treated as they are here during the ner time, blossom freely in the autumn vinter, and are in great demand.

ee ferns are also grown in this Nursery ge numbers, their stately stems and fine s of lively green fronds having a refresh- nd pleasing appearance. The importa- indeed, of arborescent forms of this rite class of plants forms one of the princi- ems of the business of this establishment, some Dicksonias lately received from alia are just now recruiting from the s of their long voyage, and getting into growing condition, as are also examples athea dealbata and Smithii, from New nd. Of other ferns, among which were a pellucida and superba, we also noticed charming little plants.

chids, as far as numbers are concerned, the most remarkable feature of this ery, in which it is not at all uncommon d a large house devoted to one particu- ecies. Varieties of the ever-blooming ste Skinneri exist here in thousands, of the sweet-smelling Trichopilia suavis, st 4000 may be found together in one e. Of Cattleyas, too, there is no end, C. ta being grown on blocks in large num- and the same may be said of the canary red C. citrina, of which at least 2000 or decorate the walls of the different orchid es. Varieties of the lovely C. Trianæi lso plentiful, while Cypripedium cauda- and Lowii are equally numerous, and of harming Oncidium sarcodes we likewise ed a fine stock.

nong Dendrobiums there is great variety, nost among which stands D. Falconeri, nfortunately it is one which often baffles kill of our best cultivators. Even that among orchid growers, Mr Anderson eadowbank, designated this a "difficult ;" but a contemporary has recently recorded the following plan by which he says success in its culture may be made easy. "In the collection of Orchids at Ferniehurst, owned by Mr Salt, and managed by his gardener, Mr Lorimer, are several plants of this species growing like weeds. Now, if their cultivation had depended only upon one or two years' success, the examples in question would not have been sustained; but there are several of them that have been in Mr Salt's nice collection for years, and their growth is certainly the best that my eyes have seen—I will not even except Mr Bateman's famous plant, and I know no other that can by comparison approach them. Some of your readers may think that I am giving vent to an unbounded and almost insane enthusiasm, in writing on this point so perfervidly, but I am only dwelling upon it thus explicitly, because, in the first place, this species is such a 'grand thing,' and in the next place, because hundreds of plants have already been lost to the country through improper and injudicious treatment. In the first place, the great majority of growers coddle the plant in too sweltering an atmosphere. The climate of the district from whence it comes shews that it must be grown in a very humid atmosphere, its roots attached to the minimum quantum of feeding stuff, and last, and not least, that it should not be subjected to a high, close temperature. Some of your readers will laugh and be apt to ridicule this plan of growing D. Falconeri, but, depend upon it, it is the right one, as I myself am beginning to see, and am determined to act upon. The Ferniehurst plants were growing in, and had never been moved from the coolest end of a Cattleya house, and they were unexceptional. Moreover, moisture is supplied largely for purposes of evaporation, as was clearly manifest from the number of subsidiary branches rooting part away from the base almost uniformly, and then the pseudo-bulbs were swollen up, and the knots peculiar to the plant remarkably conspicuous. It was as green as a rush, and as plump as the easiest and best grown of the Dendrobes are. Many of your readers know the value of this plant well enough, but when I tell those who know little of orchid prices, that an imported piece the other day brought 20 guineas at Stevens' rooms, and an established plant the week previous £50 down in the provinces, it will be readily conceived how advisable it is to hit upon the right method of culture, and how vastly appreciated sound advice ought to be. The first thing for all to do, who will take advice, is to grow their plants of D. Falconeri upon oblong blocks of pottery-ware, or wood, but the former, in my opinion, is preferable; to keep them suspended near the glass, with a tank of water, for purposes of root and pseudo-bulb supply, as near them, vertically, as possible; and above and beyond all, to let them have the privilege of living in a far cooler temperature than most people think suitable. With attention to this, failure will be scarcely possible, and death from dessication and drought a thing that will be only remembered as a relic of the past."

Among other Dendrobes, we remarked numbers of D. Eburneum, a pure white sort with a vermilion stain in the lip; and of D. albo-sanguineum, a variety in the way of D. Dalhousieanum, there is also a good stock; while as regards the more common kinds, such as D. nobile, their name is legion.

To Odontoglossum, a noble genus, in which are some of the most valuable of what are termed "cool orchids," a whole house is devoted, and among others in it we found numerous examples of the lovely O. Alexandræ and O. Pescatorei, gems among light-coloured kinds, while among brown-barred or spotted yellow sorts, were numbers of O. grande, maculatum, and gloriosum. Of these the first is so essentially a cool orchid that it will even succeed in the temperature of a common greenhouse. Indeed, if any one genus of orchid is better adapted than another to ordinary circumstances as regards cultivation, it is that of Odontoglossum.

Those winter blooming orchids, Barkeria spectabilis and Lindleyana, have here in their proper season been in great beauty, and their numbers being extensive, the display which they made was a very effective one.

One house is wholly devoted to Azaleas; and when we state that it is 200 feet in length and 16 feet in width, some idea of their numbers may be conceived. All of them are worked nice little bushy plants, which now only want common attention to make them fine specimens. These, notwithstanding their numbers, are expected to be all very shortly in the hands of the public, and, with this prospect of an early clearance, already some 12,000 nice young successional plants are worked, and are being grown on to take the place they occupy.

Camellias are also raised here in very large quantities; and no fewer than sixteen pits each 190 feet in length, are filled with heaths and epacrises. Among the heaths, the winter flowering variety is perhaps that for which there is the greatest demand, and of this kind alone the number kept in stock is almost incredible.

Among stove plants, that universal favourite, Stephanotis floribunda, is raised here annually, from cuttings, in thousands; and those winter-flowering plants, the different varieties of Epiphyllum truncatum, may also be found here in equal abundance.

For Echiveria metallica, which is now so largely employed in sub-tropical gardening there is a great demand, its large, peculiarly tinted, fleshy leaves, and, so to speak, arborescent habit, rendering it well suited not only for out-door summer work, but also for purposes of in-door decoration. We may also mention that in a compartment set apart for fruit bearing subjects we found abundance of vines, fig trees, and oranges, the last comprising all the most approved varieties, among which the small-fruited sorts especially meet with a ready sale.

Among new plants, which, comparatively speaking, may be called everybody's, Genista Everestiana is by far the best, its bright rich golden blossoms being produced in the greatest possible abundance, and, to their value be it added, they are deliciously sweet-scented. The habit of the plant is also all that can be desired, and when in blossom it is stated to remain in perfection for several weeks in succession. When more plentiful and more generally known than it is, this therefore, will prove a universal favourite, not only in private establishments, but also for market purposes. A houseful of it has been in full bloom here for weeks past, and has been the admiration of all who have seen it.

Before closing we may remark that out of ten cases of orchids lately received from abroad by Mr Low, only 18 plants reached Clapton alive! Nor is this an uncommon circur stance. Drawbacks such as these one woul think would damp the ardour of most men but to Mr Low they say, "the world is f him who has patience and perseverance Long, we say, may he be spared to exercis these virtues in so praiseworthy a cause a that of adding to the already rich treasures o our exotic Flora.

ON BOXES FOR HOLDING FRUIT.

THE following, from the *American Agriculturist*, is worthy the attention of those who grow fruit for the market:—

We have before us an inquiry from a Fruit Society about boxes, complaining of the difference in the *size* of the various patterns, and asking how much a *quart box* ought to hold. This is certainly a strange question, and we venture the prediction that just in proportion as the boxes generally used fall short of holding *a quart*, the *growers* will suffer in the end. The dishonest grower may make a few dollars extra, for a year or two, but it will be more than counterbalanced by the check given to the demand in market; for, though fruit is or can be made a cheap and staple article of diet, for which a prompt and reliable demand will be made, yet, if through "small quarts" we give only seventy-five cents' worth of fruit, when a dollar's worth is bought and paid for, a little experience will teach the economical buyer to look elsewhere for his daily food. A quart is a fraction over 67 cubic inches, and a quart fruit *box* should never hold less. But some one may say, if my neighbour uses a box that holds only fifty-five or sixty inches, I certainly can't afford to use a full-sized box, and especially if his box is the size generally used. On the contrary, we say that *you can*, and make money by it too, before the season is through, or at any-rate before a second season shall have passed. For it is not only a moral precept from hig authority, but also a correct business maxi "Give and it shall be given unto you; goo measure pressed down, and shaken togethe and running over, shall men give into yo bosom." The first shipment you make wi be *sure* to place your honest quart—on whic it will pay you to put your name—by the sic of some one's *dishonest* quart, and so far as attracts attention, and among the wholesa and retail dealers, and consumers throug whose hands it passes, this will not be at a inconsiderable—you will have established "brand" of fruit, which, if the character the fruit is proportionately good, will be th finest in the market, to be remembered ov night and looked for in the next day's shi ment; and as your brand becomes wide known, it will be in quick demand at th highest price, not only when the market brisk, but also when it is glutted, of whic quick, first sales will make you independen while your "small quart" neighbour, who ha also established a "brand," receives the r turns "low prices" or "no sale." Quic sales is what you want; it is better to have goodly number of retailers waiting on yo commission merchant for your fruit to arriv and take it in preference to all others, becau its attractive appearance, good measure, ar good quality pleases their customers, rath than to have them shun it on account of i former "shortcomings," so long as any other can be obtained.

It may sound rather Hibernian to say the best *boxes* are the *baskets*, but experience proves the fact. Thousands will buy the square gift boxes at three-fourths of a cent each, because they are cheap; and often they answer very well, as for home market or shop shipment. But for distant markets, where fruit must be several hours packed, the baskets that give the most air to the fruit, costing from two to three cents each, are much the best, the fruit often selling for enough more to pay for the basket, and at times at still greater advantage, for the fruit in them will often arrive in good condition and sell well, while that in the close boxes will be so greatly injured as scarcely to pay charges. Another advantage of the baskets is, that they can be nested together and thus put in very small compass and returned at a light expense, to be used again and again, while the crate in which they are sent t market, and which may be a cheap affair, nee not be returned. A crate holding fro twenty-four to thirty-two quarts, will gen rally give the best satisfaction. But in a cases the judgment of the grower should b exercised in his boxes and crates, as well a in growing the fruit. What you want to d is to put nice fruit in market, and in nic condition, using just the means necessar which may differ according to location o market, and spend no money that is n needed to accomplish that purpose; for, aft all, the *profits* of the business are among i most attractive features. And although sma fruits have come to have a solid market valu yet their great beauty also pleases the fanc and the fact that in all markets there ar customers looking for and paying for th finest fruits they can find, is being taken a vantage of by many intelligent growers an shippers, greatly to their advantage.

FRUIT-TREE AND VINE PROTECTOR.

THE patentee of this useful invention (Mr W. E. Rendle) states in a pamphlet recently published, intitled "England a Wine-producing Country," that sufficient protection against cold, without the heavy expenses of the building, and constant repairs of ordinary hothouses, is the boon that these protectors bring within the reach of all classes; and that, with a sheet of glass, a common drain tile, and a handful of hay, all the best fruits may be grown to the highest perfection. Without the aid of fire-heat, grapes may be ripened throughout England from t middle of August; and by means of it they may b ripened in continuous succession all through the yea The great essentials claimed for these protectors a cheapness, simplicity, portability, and durabilit They are cheap enough to come within the reach the million; so simple that every one may use then portable enough for any one to carry them under the ar from one crop to another, and so durable as to la for several generations. Fig. 2 represents a secti

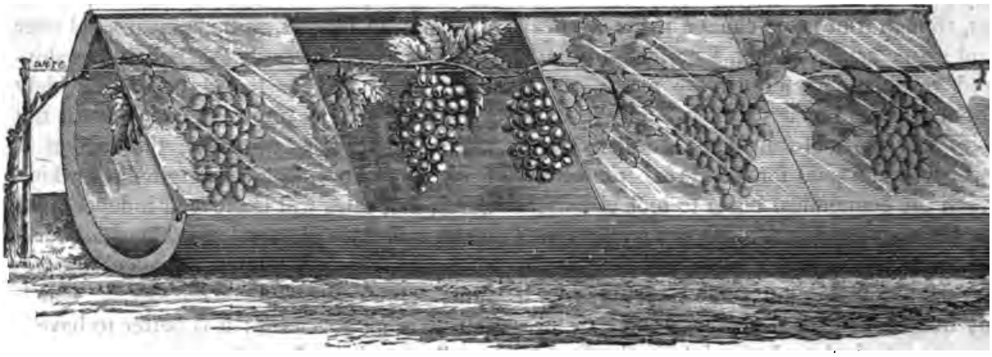


Fig. 1.

of a vine protector, of which the semicircular portion is composed of earthenware, such as common drain tiles are made of, and the other part of glass; and fig. 1 shews the mode of its application to a vine planted at the end, and trained to a wire which is carried along to any required extent through a series of tubes placed end to end. When fire-heat is intended to be applied, the vines are planted on each side of a carefully prepared narrow border running due north and south, and trained east and west, as shewn in figs. and 4; the roots being warmed as well as the to the Muscats and other tenderest kinds being plant nearest to the boiler or hottest end; Hamburgs a other intermediate kinds in the middle, while t Muscadines and other hardy early ripening kin occupy the coldest ends, only a few of the latt being planted in the warmer parts for earliest us So arranged, the inventor opines that the luxury of

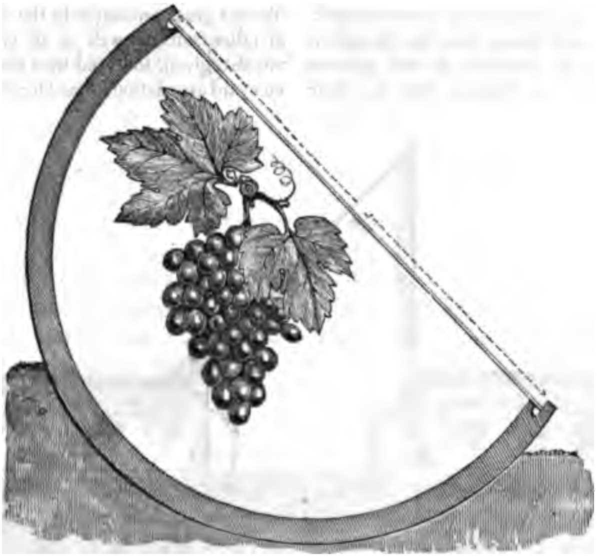


Fig. 2.

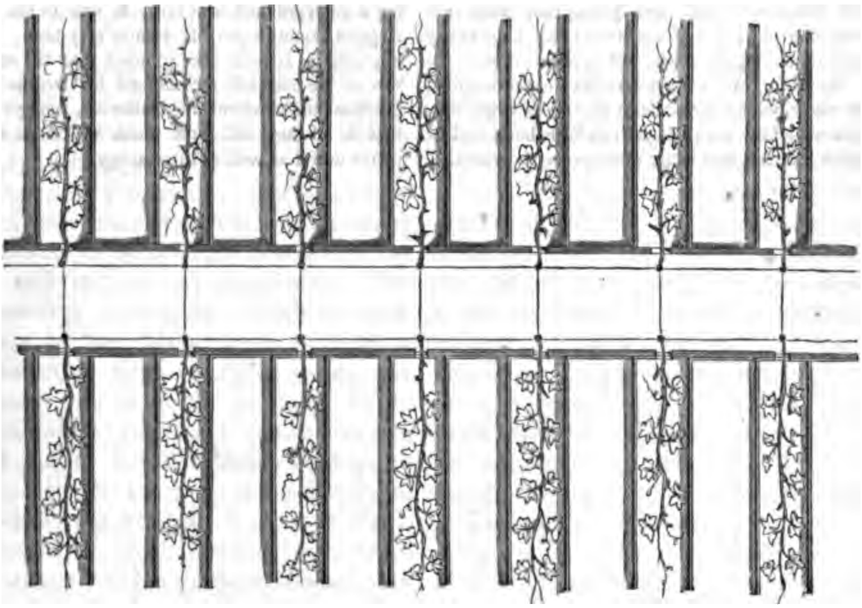


Fig. 3.

constant supply of good grapes will be brought within the range of all classes. He sees no reason why every cottager and mechanic should not grow his own grapes as successfully as he does his own cabbages, onions, and potatoes, and hopes that his invention will render the vine as common in our gardens as the hawthorn is in our hedges, and the furze on our commons; that our population may not only occasionally see, but constantly eat abundantly of rich, nourishing, luscious, self-grown grapes. In these laudable, but we fear rather over-sanguine, hopes, many will acquiesce heartily, and although they may never be fully realized, yet this little book will be read with interest, and many of its precepts profitably practised by those who have the will and opportunities to give them full and fair trial. Figures and descriptive remarks, shewing the application of these tile and grass protectors in the rearing and maturing of other fruits, as well as of vegetables and flowers are also given, followed by a prospectus of an English vineyard association formed for the purpose of establishing a vineyard and fruit farm in one of the souther English counties, on Mr Rendle's system. Withou implying an acquiescence in much that the author advances, we cordially recommend his treatise to bot practical and amateur horticulturists, being convince that in it they will find much which to them wi prove useful as well as interesting.

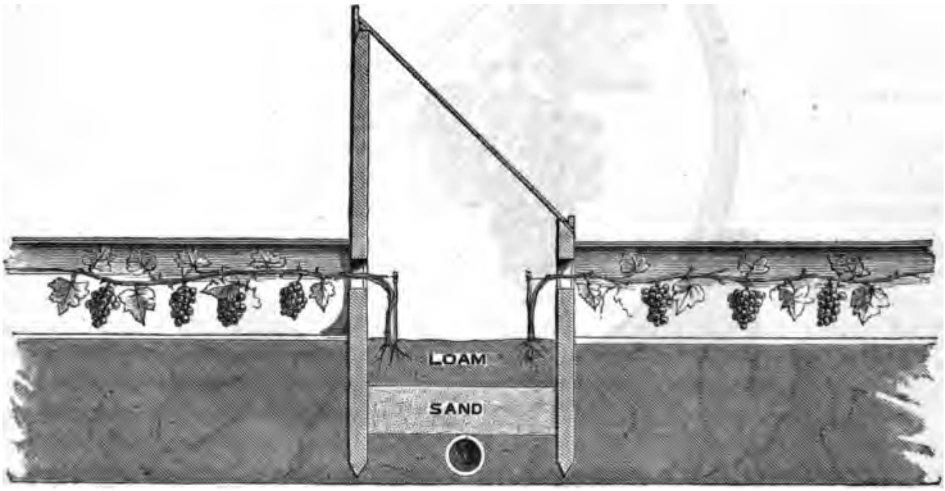


Fig. 4.

Rambles by Road, River, and Rail.

A TOUR IN THE WEST OF SCOTLAND.

CASTLE KENNEDY.

ALTHOUGH, as we remarked in a former article, that the pleasure-grounds, and that portion of the estate that came within our vision, were remarkable for their absence of aged trees, it has not been always so. Groups of beeches, of ash, of elms, of chestnuts, of hollies, and of yews, had been conspicuous even at the dawn of the present century; but what with injudicious thinning and a general impoverishment of these ground-marks of the wisdom and industry of our forefathers, it left them so infirm that a severe storm prostrated nearly all the remainder, leaving the estate, in point of trees, a comparatively desert place. Beeches and fine evergreen oaks stand conspicuously isolated alongside of the famous groups of Coniferæ, that are bound to tell with wonderful effect upon the future arboricultural features of the Castle Kennedy pleasure-grounds.

Independently altogether of arboricultural features, these grounds present a configuration well adapted for exhibiting a remnant of the antient style of picturesque gardening. The grass terraces themselves, stretching along the base of the Black Loch, and rising in consecutive tiers at right angles one to another, to a height of from 20 to 30 feet, with their steep grassy slopes, remind one of the Babylonian gardens, as described by Dr Falconer in his history of the "Gardens of Antiquity." These terraces are relieved at equal distances with broad level platforms, and a group of beeches, as a prominent eye-subject in the landscape, is highly necessary at stated intervals, when we note that the length of these terraces, following out the lines measured by Mr Fowler, are something little short of 14 miles. Looking to the two extreme ends, which a planted to intercept the vision to the lal and to the high grounds beyond, it was highly pleasing sight—doubly so on a scorc ing August day of the memorable year drought and heat of 1868. The undulatir ground, planted in beltings or plantations f effect on the one side, and these mul tudinous sloping terraces on the other, eac reflected in salient points in the bosom that magnificent lake, presented quite panoramic view to the spectator, heightene indeed, in effect to the naturalist, as he migl observe the cormorant lumbering along wit its wings flapping and skimming the surfac of the water. Excellent sport is in sto here when stormy weather compels wild duc and teal to leave their resort on the estua of the Clyde, and take refuge on t less troubled waters of the lakes.

This style of pleasure-ground decoratio was set on foot by the great Marshall Sta some 140 years ago. This nobleman bein second Earl of Stair, was a most distinguishe military commander and an accomplishe statesman; albeit he had a somewh chequered career in life, but died full honours, reckoned by his biographer as th most handsome nobleman of his time, an the first diplomatist of the day. His laudabl ambition induced him to presevere, in qui moments at home, to the improvement of h estates, and to the decoration of his pleasur grounds; and to him was accorded th credit of being the first to introduce the cu tivation of turnips in the fields as food f cattle. Certain it is that he had been considerable pains and expense to place th grounds of his Wigtownshire seat as amon the foremost of their time. He had encouraged the rearing of beech and yew hedges to some extent, and they had grown, in latter days, up to a height of 60 feet, for years trimmed up properly, and kept in first-rate condition; but, as we are informed, towards the beginning of this century, and for a period of thirty years afterwards, had been totally neglected. What with the prostration of the trees by storm, and the roots and stumps left remaining in the ground, and the general barren aspect of a fine place left very much in the position of an estate, or rather pleasure-ground, forgotten and forsaken, little wonder that Nature had asserted her prerogative, and instead of smooth-shaven lawns and well-kept drives, such formidable weeds as whin, heather, broom, and nondescript seedlings, grew up, warring with one another.

Such was the state of matters, from a horticultural point of view, when the present branch of a stock, often removed, came in possession of the earldom and the estates. Although in his seventieth year, Sir John Dalrymple, the eighth earl, and uncle of the present noble owner, set about with a will to the renovation of this chaotic confusion, and at once engaged the services of a competent headsman, the present Mr Archibald Fowler, to superintend operations. Numbers of men were employed trenching the fallow ground, removing the large roots, and generally dealing with the pleasure-grounds upon a scale commensurate with the importance which he had foreshadowed they were likely to bear. All the ground was well manured either once or twice, green cropped as was necessary to victimize the herd of weeds that had taken nearly sole and undisputed possession, and afterwards sown down and otherwise dealt with as to permit the introduction of those interesting Coniferæ, which have a far wider than merely local fame. But his ambition prompted him not rest contented with only setting his own house, his own grounds, in order; he organized a system of drainage over the whole Wigtownshire estates, had proper fences introduced where necessary, formed good roads repaired and renewed, where necessary, farm buildings, and gave such an impetus to agriculture in the west as till then was unknown. As is well said by our informant, "Agriculture was not in an advanced state at that time in Wigtownshire, but the judicious and well directed improvements which his lordship so warmly and heartily entered into, soon produced appropriate fruits. As an incentive and stimulation to industry regarding his tenants, liberal prizes were given for the best managed farms, and special prizes for turnip culture. It may now be fairly said that he laid the foundation for the present extensive and prosperous dairies which are the pride and the boast of Wigtownshire farmers, and that he did more than any other man in his day to place the border county among the best farmed districts of Scotland.

Where arboricultural baldness prevailed, and where shelter was necessary, this nobleman planted largely; and now plantations of thirty years' standing are rising up, mushroom-like around. To him belongs the credit of collecting together the nucleus of one of the finest Pinetums in the northern division of our island and planted, too, with an effect which one requires to see to be thoroughly cognizant of Its high interest not only as a present object of beauty, but destined, as it is, to take the lead as one of the rare sights in exotic arboriculture north of the Tweed, is obviously acknowledged His brother, the ninth earl, succeeded to the estates in 1853, and continued the good work of addition to the collection, and of improving and enhancing the amenity of the pleasure-grounds in a variety of ways, commencing the fine baronial castle which we have already noticed, and which he did not live to see finished. His son John, tenth earl is now in full possession of the family estate and honours; and, judging from the operation that he, in his pastime, is setting afloat, the end of improvement is not just yet. To him must be accorded the honour of catering for comfortable adjuncts, for devising approach making upon no limited scale, and for giving marked attention to the rearing of those artificial screens of wood that must some day tell well upon the landscape. It is highly important to take due cognizance of this, especially in grounds where the youth of the trees betoken a nakedness, and exhibit rather hard and artificial lines even in groups, which only age can properly rectify. Larch and spruce grow on respectably, and offer to make excellent nurses for such of the hardwood trees as have been introduced. Looking to results of growth, however, whether exposed or sheltered, if any one were to put the question which tree would you recommend as the best nurse for general work at Castle Kennedy, however absurd it may seem to most people, the answer must be the Araucaria imbricata. No position seems to affect it disagreeably. It grows quite plethorically, and grows handsomely too, rising up proudly above compeer plants of Scots fir, planted as nurses for these shaggy fellows, which are mere scrags, that have lost all character to decoration, and seem fitter for the bonfire, where exposed, than either for beauty of outline or value in point of timber. This is a most remarkable fact, that this exotic plant of the coniferous tribe from Chili finds a delightful and comfortable home along our sea boards—that is, where the thermometer d not fall below 16 deg. Fahrenheit—the low point reached even during that severe Chri mas, 1860-61, at Castle Kennedy. Now, our observations had been taken from limited number, and these, too, confined one spot, the deductions therefrom wo have been comparatively worthless, but th meet you in a variety of places; and so sat fied is Mr Fowler of their appropriateness plants for exposed positions, that he is n introducing them where few things else w grow. This practical arboriculturist has h an experience of them for twenty years, and though he has had very much to feel his w in the matter of trial of capability and poi of endurance, he is now, backed by that e perience, quite decided as not only to th general value as decorative plants, but th protective value. They form here, and th are bound to form upon the sea-board gen rally, nurses and screens for a variety compeers remarkably well favoured, but b coming ill-conditioned if exposed to t rigours of a fluctuating climate, storms of wi being their worst enemies.

Arboriculture.

DISTRIBUTION OF THE PRINCIPAL FOREST TREES AND PROGRESS OF FOREST CONSERVANCY IN INDIA.

BY DR H. CLEGHORN.

WHEN the British Association met at Edinburgh in 1850, a committee[*] as appointed to consider "the probable fects, in an economical and physical oint of view, of the destruction of tropil forests." Their report was presented 1851 at Ipswich. Attention was thus irected in India to the importance of preerving every influence which tends to maintain n equilibrium of temperature and humidity, f preventing the waste of valuable material, nd the special application to their various ses of the indigenous timbers of the country.

A few years later forest establishments ere sanctioned in British Burmah (1855), nd in the Madras Presidency (1856); and 1864 Government laid the foundation of n improved general system of forest admiistration for the whole Indian Empire, ving for its object the conservation of tate forests, and the development of this ource of national wealth.

The executive arrangements were left to he local administrations, general principles eing laid down, the most important of which s, that all superior Government forests are eserved and made inalienable, their bounlaries marked out to distinguish them from waste lands available for the public. Act 7 f 1864, defining the nature of forest rules nd penalties, has been adopted by most of the local governments.

Valuation surveys have been made to obtain reliable data as to the geographic distribution of the more valuable trees, the rate of growth, and the normal yield of the forests.

Bengal.—In British Sikkim and the Dooars of Bootan there are large tracts of Sal forests not yet surveyed. The produce of these forests is required for any extension of the Eastern Bengal Railway which may be determined upon, and for the doubling of the East India line now in progress. In the Darjiling district the higher slopes above 6000 feet have been reserved, and plantations, both of temperate and subtropical trees, have been formed. In the Terai several thousand Mahogany trees have been planted out—raised partly from seed naturalised at the Calcutta Botanic Garden, and partly from seed received from the West Indies, through the Colonial Office and Dr Hooker. In Bengal the department had for two years the great advantage of Dr Thomas Anderson's superintendence, whose botanical knowledge was of special value in the exploration of the little-known forests of Sikkim and Bootan.

North-West Provinces.—The recent surveys have added much to our knowledge of the North-West provinces. In Kumaon and Gurhwal the area surveyed is about 400,000 acres; a large part of this is covered with Pinus longifolia, bearing an average of fifteen trees per acre. The Himalayan Box is plentiful in certain localities, and has come into use in the schools of art for wood engraving. The Goruckpore forests cover 120,000 acres, and consist mainly of Sal (Vatica robusta), with an average of twenty-five well-grown trees to the acre.

The northern limit of indigenous Teak is in Bundlekhund; it has been planted in the Punjab, but in that dry climate it is poor and stunted. The management of the forests of the North-West provinces is second in importance only to that of Burmah.

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[*] The late Dr Forbes Royle, King's College, London; the late Colonel R. Baird Smith, R.E.; Colonel Richard Strachey, R.E.; Dr H. Cleghorn, F.L.S.

Oudh.—From the survey in Oudh it appears that more than half of the Government forest consists of Sal; the other reserved woods of greatest value are Sissoo, Toon, and Ebony. Considerable sums have been expended in clearing the Sal trees of destructive twining plants.

Punjab.—In the Punjab the forests growing on the banks of the Five Rivers have been formed into so many ranges under skilled officers, and timber operations have been conducted with more or less success in the intramontane districts. Long leases of the Deodar forests, in the territories of the Rajahs of the Chamba and Bussahir, have been negotiated. Wood is the only fuel at present available in quantity for locomotive purposes. The requirement of the railway alone is estimated at 50,000 tons annually, and the yield of the old shikargahs or fuel reserves, being inadequate, skilled management has been brought to aid in the increased production of fuel.

Selected tracts have been trenched and ploughed before planting, and cattle and camels are strictly excluded. The services of two trained foresters have been secured. The suitability of some Australian trees to the arid plains of the Punjab is remarkable, and several species of Acacia, Casuarina, and Eucalyptus have been tried with apparent success. The northern limit of the Sal is on the bank of the Beas River, in the Kangra Valley, but here it is small and stunted.

Dr J. L. Stewart, the conservator of the Punjab forests, has contributed some valuable papers to the Journal of the Agricultural and Horticultural Society of India, as "Tour in Hazara and Khagan," "Flora of the Peshawur Valley," and "Bijnour and its trees."

Central Provinces.—In the Central Provinces the revenue settlement was proceeding when the forest department was sanctioned, and the demarcation of reserved tracts took place simultaneously, which was a great advantage. Six ranges have been established, and Teak plantations have been commence on the Taptee and Nerbudda rivers, and a to be steadily pursued on the plan of th Conolly plantations in Malabar. Two traine foresters from Scotland have been employe for some time. The attention of the depar ment in this province is directed equally t Teak and Sal timber. The other reserve woods are Sissoo and Bijasal (Pterocarpus.)

Berar.—Forest operations have been mo recently undertaken in the Hyderabad assigne districts. The character of the vegetation r sembles that of the Central Provinces, and t same species of trees is reserved. The on Teak tract is at Mailghat, north of Ellichpor and it is carefully preserved.

Mysore.—The territories of the Rajah Mysore have always been famous for Sand wood and Teak; the former occupies a markable belt about 30 or 40 miles inland fro the crest of the Ghats, though fine self-sov patches are diffused over the whole tablelan In the adjoining district of Salem, a consid able quantity of Sandal-wood has lately be discovered in the Collamully and Putchamul hills, and two small patches occur in Sou Canara, but these are at a lower elevati and the timber is inferior in quality. T western part of Mysore is clothed with fi forest, but much has of late given place coffee culture.

Burmah.—The progress of forest admin tration in British Burmah has been steady, wi a large increase in the forest revenue. 1864-5 nine Teak forests were demarcated the Tharawaddee division; the aggregate a of these is about 50 square miles. The nec sity and importance of forming plantations becoming every year more apparent. A commendation to plant on a large scale w made 40 years ago by Dr Wallich, and aft wards by Dr Helfer. It was again stron urged by Sir A. Phayre and Dr Brandis, their joint report of June 1864, and planti is now systematically carried out. There now eight Teak plantations, which are bei added to by annual increments, and plan in different ways to test the expense wh must be incurred in raising Teak on a la scale. The facts recorded in the last rep as to the germination of seed from different localities, and the measurement of growth of young trees, are interesting for comparison with the results obtained in Malabar and in Java. Further experience in management is annually gained, and it will be ascertained how far the same system is applicable to different provinces.

In Arracan, the most valuable timber tree is the Inga xylocarpa, termed Ironwood from its exceeding hardness. The wood has been found useful for railway sleepers, and is exported to Bengal.

Madras.—The forests of Madras have for twelve years been under the care of a special department. The most valuable timber is Teak, which is to the south of India what Deodar is to the north, and Saluto the central provinces. Energetic efforts are being made to restore the woods in this Presidency, and very extensive plantations are formed, particularly in Malabar and South Canara (Teak), Neilgherries (Eucalyptus and Australian Acacia), Cuddapah (Red Sanders-wood), Shevaroys (Toon and Teak), and Sigur (Sandal-wood). By far the most important of these are the Conolly Teak plantations in Malabar, which are rapidly increasing in value by the growth of the old plantations, and the annual increment of fresh planting. In 1866-7, 120,000 seedlings were planted out. The consumption of wood for railway fuel is enormous, a special train laden with wood for locomotives leaves Coimbatore, and another leaves Cuddapah every day, in addition to the regular trains taking in wood at fuel stations. The natural jungles, which have hitherto supplied this large quantity, are now in some districts so nearly exhausted that the mere protection of those which now exist will not yield a permanent supply. The natural reproduction of the indigenous jungles (where cattle are excluded) is expected to furnish a large of fuel, but it is further intended t plantations for locomotive requir These, in accordance with the instr of the Secretary of State, are to be un management of the Forest Departme their cost to be a charge in that depa These operations involve present an spective outlay, with no returns till af lapse of seven or eight years. This tant branch of forest work must increa the extension of railways, and it is hop the example set by Government ma the effect of stimulating private individ form similar plantations. The financi dition of the forest department in is satisfactory. The total net surp eleven years, including the value of ti store on 30th March 1867, is £180, from £15,000 to £20,000 a-year. Wit last few years much has been done way of improving forest communicati remote and difficult places..

Bombay.—In the Presidency of B the forest department is of old sta Mr N. A. Dalzell succeeded Dr Gibso first conservator, and is an accomp botanist. For some years the receipt exceeded the expenditure by several say £30,000 annually. The demarcat reserves in the Deccan has been in pr and is a most important measure. T ministration of the forests in Scind has re the commendation of Government. demand for firewood, both in large town for steamboats and railways, has augm very considerably, shewing the absolu cessity of husbanding the resources, so keep up a regular and abundant sup fuel. The Babool (Acacia arabica) is th which thrives best in Scind, and the tim much prized for many purposes.

ON THE MANAGEMENT OF EUROPEAN FORESTS.[*]

MY LORD,—I have the honour, as directed by you, to report, for the information of H.M. Secretary of State for India, that I left Madras on medical certificate on 27th October last, and reached Malta on 27th November, where domestic circumstances obliged me to remain for three months. During this period, I occupied myself in examining the Islands of Malta and Gozo, and received much cordial assistance from his Excellency Sir Patrick Grant, G.C.B., in my researches as to the physical condition of the islands.

From the absence of water and soil, there are very few trees, and I concur in the truth of Dr Sutherland's remark,[†] "The great improvement required everywhere, but particularly in the vicinity of the barracks, is shade from trees; this can only be obtained at considerable labour and cost," as the soil consists of a thin covering of earth on soft sandstone. A good beginning has, however, been made in the public gardens of Florian, and several parts of Valletta have been successfully planted with beautiful trees by the late governor, Sir J. Gaspard Le Marchant. The most thriving of these are Pinus pinea, Cupressus sempervirens, Phytolacca dioica, Schinus molle, and Araucaria excelsa.

Among the trees which appeared to thrive best at the Government garden of St. Antonio were several species of Acacia and Eucalyptus from Australia, the same species which have been successfully introduced on the Neilgherry and Pulney Ranges of South India, and which endure the great heat of the Punjab. I had subsequent opportunities o observing the same species flourishing in Sicil and in various parts of Italy from Naples t Genoa; this is an interesting fact in acclimatization. These fine trees are cultivated i the open air, and it was lately suggested i the *Revista Forestale*, a monthly periodica published at Florence, that they might b used with advantage for reforesting the lan at the base of the mountains of Sicily an Italy.

The timber for house and boat building i Malta is imported from Trieste and Americ and charcoal is supplied from the oak fores at the base of Mount Etna, and sometime from Greece.

My inquiries at Malta were of a non-offici character; but before leaving I placed in th hands of Sir Victor Houlton, Chief Secreta to Government, letters to Major Beddom my deputy in Madras, and to Dr F. Mulle Director of the Gardens, Melbourne, in whic supplies of seeds were solicited, and a syste of reciprocal interchange proposed. It wi probably be best to obtain seed direct fro Australia, as all that is collected in India is a present required for the railway fuel plantations.

I have also consulted Dr Hooker, Directo Royal Gardens, Kew, as to his ability t supply select trees for this Mediterranea station, and he has expressed his readiness with the sanction of the First Commissione of Her Majesty's Works, to give any assis ance within his jurisdiction.

From Malta I proceeded to Sicily, and sa the Botanical Gardens at Catania, Messin and Palermo. Near the last city, I visite an interesting school of agriculture, where th cultivation of Sumach, and other econom plants, was being carried on. Colonel Yul C.B., has kindly translated, at my request, treatise on the cultivation of this useful tre

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[*] A report by Dr Cleghorn, Conservator of Forests, Madras, to Lord Clinton, Under Secretary of State for India.

[†] See an admirable account of the topography of Malta in his Report of the Sanitary Condition of the Mediterranean Stations, Part II., 1863.

(Rhus coriaria), which has been read at the Botanical Society of Edinburgh, and will appear in the *Transactions*.* I would venture to recommend that the paper be circulated in the Punjab and other parts of India, where several species of Rhus grow.

The following figures, obtained at the Custom House, shew the export of Sumach from Palermo on which duty was paid in 1867:—

Sumach in leaf, kilogrammes 2,323,130, or, say, tons 2,282.

Sumach ground, kilogrammes 15,692,699, or, say, tons 15,413.

The climate of Palermo appears to be favourable for maturing seeds of many plants grown in North India, and an interchange of plants and seeds has been initiated with the Calcutta Garden; two large cases from Dr Anderson arrived while I was there. It occurs to me that it might be advantageous to the horticultural societies of India to obtain their supplies of seed from a dry climate, nearly in the same parallel of latitude with the Punjab.

The state of the roads in Sicily is not favourable for transporting the timber from the pine and oak forests which clothe the slopes of Mount Etna. Firewood and charcoal are brought down in large quantities on the backs of mules for the supply of Malta and the adjoining islands.

Vast herds of cattle and goats pasture at certain seasons in these forests, and there is a brisk trade in carob beans, almonds, hazel nuts, walnuts, chestnuts, and other forest produce, yielding an annual revenue. Oranges, citrons, and mulberries are very extensively cultivated. Olives and prunes are planted at regular distances on the steep declivities, nd bind the soil together with their roots. ne climate permits of shady trees being reely introduced in land occupied for agri- ltural purposes.

n Sicily and Calabria there is a great tent of the manna ash tree (Fraxinus rnus). The following statement, abstracted rom the returns in the British Consular Office, shews the value ot the drug export during the last four years:—

—	U. S.	Baltic	France	Great Britain and Colonies.	Italy	Other Countries.	Total
	£	£	£	£	£	£	£
1863	758	368	2,593	9,841	—	3,377	16,93
1864	1,377	1,500	4,446	10,048	100	5,259	22,72
1865	3,514	500	2,141	4,257	200	2,200	12,81
1866	4,076	1,500	2,384	4,354	300	2,258	14,87

The merchants concur in saying that th demand is falling off.

In Florence, by the kindness of the Ho Mr Marsh, Plenipotentiary of the Unite States, and of Signor Filippo Parlatore, Pr fessor of Botany in the Imperial Universit I obtained a copy of the *Manuale Teoric pratico d'Arte Forestale*, 1864, now used by a the forest officers in the kingdom of Italy, an also the *Compendium of Forest Regulation* published by the Minister of Agriculture i 1866. A careful study of these books shew that though less attention has been given t sylviculture and to forest legislation in Ital than in France and Germany, yet the scarcit of constructive material, and the destructiv action of torrents, have aroused the attentio of the Government, and the importance of sound system of forest management is now a clearly recognised in Italy as in neighbourin countries.

Many landed proprietors, including Baro Ricasoli, are planting successfully, though no forming forests on an extensive scale; an discussion has taken place in the Chamber o Deputies as to the replanting of denude mountain tracts in Alpine Italy. The unio of the Italian petty States under one govern ment has rendered practicable the arrange ments for conserving and restoring its unex hausted forests, but the state of the kingdo is not yet favourable for steady progress i this branch of legislation.

It may be noted that a monthly periodica has been published for six years, which con tains many interesting contributions on sylvi culture, and the *Bibliographia Italiana* con

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prises, among many others, the following recent works, which are specially worthy of perusal :—

Caimi, P. Memorie sull importanza e coltura die Boschi.—(Milano, 1857, 8vo.)

Cerini, G. Dei vantaggi che apporterebbe allo Stato ed alla condizione idraulica dei territorj l'instituzione di Società per l'impianto e conservazione dei Boschi.—(Milano, 1844. 8vo.)

Meguescher, F. Memorie sulla migliore manièra per rimettere i Boschi della Lombardia, &c.—(Milano, 1859. 8vo.)

An Italian edition of "Man and Nature," by the Hon. G. P. Marsh, is now in the press, containing an excellent account of all that is being done to improve the Maremma of Tuscany, and giving the history of the legislation of the former Republics of Venice and Genoa for protecting the forests of the Appenine and Maritime Alps.

I made the acquaintance of several Italian botanists and forest officers,* with whom a profitable intercourse may be kept up hereafter.

In Switzerland I had an opportunity of seeing the spring operations on the borders of the Lake of Geneva, where felling was being carried on, and pine logs are stored in large quantity; these are brought down from almost inaccessible positions by various mountain torrents. When the snow melts and the flushes commence, the logs are launched without loss of time, as in the intramontane districts of the Himalayas. The moving and sliding of the timber and the floating operations are very instructive.

The wooded crests and high forests overhanging cultivated valleys are strictly preserved. They serve as "boulevards" against avalanches and cataclasms; and this preservation has been found to be equally necessary in the deep chasm valleys of the North-West Himalayas.

The communal woods around Berne and Geneva are treated with great care, but are not so rigidly and economically conserved the State Forests in France and Germany.

In passing through France, I took tl opportunity of seeing as much as possible the Forest administration between Bâle ar Nancy. At Nancy I spent six days, and h several conferences with Professor Hen Nanquette, Director of the Imperial Scho of Forestry, with M. Matthieu, sub-directc and the other professors, who explained ful the system of training.

The institution was founded in 1824, ar the buildings are now being reconstructe and enlarged. The students, eighty in nur ber, live in the school, except the ten foreig pupils, "externes :"—

British . . .	5
Belgian . . .	2
Portuguese . .	2
Swiss . . .	1
	10

who have private lodgings close by. All a under strict discipline, and, except in tl wearing of uniform, the foreign pupils co form to all the rules, of which there has be no infraction on the part of any of our you men. The director spoke in a kindly mann of them, and with much satisfaction,* ai said that they were fond of the work ; on tl other hand, they are happy and contente and allude to the "bonté," shewn them l the director and the professors.

In the general register of the "Ecole F restière," the stipendiary students intend for India occupy a fair position.

Mr Pengelly stands the ninth in the whc school, which, considering that he has be studying in a foreign language, must be co sidered very good. From the reports of I Nanquette, as well as from personal int course with the young men themselves, Nancy, I feel sure that one and all will pro useful assistants.

I have derived great pleasure from seei the French system of culture of woods, a the general management of large tracts orest, as it is practised in that empire. The different features of the aboriginal woods present many points of analogy with the forests of Northern India; and it is instructive to note the careful investigation of the relation of the wooded surface to the water supply.

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* Professors Toruabene, Catania; Todare, Palermo; Inzènga, Palermo; Cesati, Naples, Pasquali, Naples; and F. Parlatore, Florence.

* "Bien satisfait."

The manuals prepared for the use of the Forest School are specific in their details, and are in every sense practical handbooks. We have not at present a sufficient stock of facts for the compilation of a Forest Manual for India, but the time is approaching when similar guides may be prepared with much benefit to the department.

The only point in the training of the pupils to which I would draw attention is the Forest Code of France. The processes as to trespass, and other forest offences, are very different from the provisions of the Indian penal code, or the Forest Acts which have bee passed by the local governments and administrations.

Although the pupils cannot fail to deriv benefit from the precise rules laid down, an from the habit of watching the cases tried yet it appears to me that the French rule which are inculcated are more stringent tha it would be desirable, or perhaps practicabl to introduce into India, where it is ofte difficult to obtain a conviction for fores offences under the mild provisions of th Indian Forest Act.—I have the honour to b your Lordship's obedient servant,

H. CLEGHORN, M.D.,
Conservator of Forests, Madra
On Leave to Europe.

The LORD CLINTON,
Under Secretary of State for India.

The Stable.

ROUGH LEAVES FROM THE NOTE-BOOK OF A VETERINAR SURGEON.

CHAP. XII.

THE remarks at end of chapter XI. are, I admit, but general instructions as to the symptoms of pleuro-pneumonia and bronchitis, which are all combined; therefore, I have avoided all distinct classifications, of which there are too much in papers of this kind, and which only add to their mystification. I have before alluded to a state of the same combination of diseases, in which the acute symptoms seem to have passed off unobserved, or, if so, neglected, and which assumes a low, sinking, or typhoid form, the symptoms are similar, as before described. Although not so strongly or acutely marked, they have become more chronic; the animal seems wasting away, the cough seems more hollow in sound, the discharge from the nostrils is more thick and sticky, with at times streaks of blood in it. This is generally a bad symptom towards a successful termination. The fæces are thin and hard alternately, often discharged of both kinds, very black and fœtid, and at times also streaked with blood; always a slimy mucus attached to the hard portions, glueing them together; the appetite may be off and on, at times feeding somewhat heartily and *vice versa*. The pulse, if the typhoid fever or sinking is not far advanced, may keep stronger than one would expect, looking at the general state of the poor animal, and if so, this is a favourable symptom as regards the treatment. Again, as the disease advances, the pulse gets feeble and intermittent—that is, stops for a few beats and goes on again; debility will be setting in, and all hope will be lost at least getting to this point. Still, I have seen some critical cases in this stage ultimately do well, and make good beef, but seldom or never so as to be useful for the dairy. As regards the tre ment, that requires great practical discrimi tion and also experience, and of which or a few general rules can be laid down here as guidance. If the pulse is pretty strong a the appetite not altogether gone, with heavi at the flanks, and breathing quick a laborious, bleeding is plainly indicated, but should be done with caution. As a gui to one not accustomed to the pulse, t following instructions will be a safe criteri to go by :—Should the blood flow easily, a when about a quart or so is drawn off a becomes thin, with a dirty yellowish kind of a pearance, and the animal commences shifti her forelegs, as if she seemed afraid of fallin stop the bleeding directly; no harm will ha been done, and, it may be, a decided bene gained; but should the blood be blacki and thick, flowing sluggish, a very consid able quantity may be drawn off before affects the animal; and when you find t blood become more thin and red, you m safely stop, and consider the same as a go omen. The next thing is physic, and here generally used a strong decoction of cam mile tea, instead of water, in dissolving t medicine (which was the usual dose as befo prescribed); but if there was diarrhœa prese and somewhat strongly marked, with no ha portions, I would only give the usual sedati in camomile tea twice or thrice a day, as t symptoms indicated, horning down plenty flour gruel, coaxing the animal with sm portions at a time of cold boiled turn mashed in bran or oatmeal. After the fever b gins to allay, slight constipation will begin, or generally does set in as the fever abates. Wh you perceive that, and the fæces are cover with the thin black crust, as before remarke you may then safely give your purgative; but I may here remind the reader that in the early acute stage, if diarrhœa is present, and although it is strongly marked, you must give a dose of physic, whether there should be hard portions or not. Blisters and setons will be used as before ordered, and when the fever is abated, which you will know by the breathing and pulse getting quieter and more natural, should the animal appear weak, seemingly inclined to eat, but somehow cannot, tonics and stimulants may be now gradually given. My practice here, as remarked in another place, was to give a sedative in the morning, tonic in the middle of the day, and perhaps a stimulant at night, in the shape of a pint of good old ale mixed in some gruel, adding half an ounce or so of ginger, in this and other cases of which we are now treating. When a stimulating tonic and sedative are required, a most valuable mixture, especially in pleuro-pneumonia, I have found the following good :—Take of sulphate of copper 1 ounce well powdered, and dissolve in 4 ounces of boiling water; when cold place in a glass bottle, and add liquor ammonia —*i.e.*, spirit of hartshorn—till a precipitate begins to fall; dose, ½ ounce, mixed in ½ ounce sweet spirits of nitre, and adding 2 drachms extract belladonna; rubbing down or dissolving the belladonna previously in a little hot water; adding liquor ammonia acetatis 2 to 4 ounces, giving the one at night and the sedative powder in the morning, or, as it happens, night or morning, or middle of the day; at another time giving gentian, ginger, camomile tea, varying one or the other. I always considered it of great advantage to change the medicines occasionally as above, coaxing the animal with small portions of boiled food, a little clover grass if in season, a slice of carrot or turnip, a little steeped malt, or a handful of hops steeped in boiling water, giving the tea, which is an excellent tonic; boiling some ice clover chaff, and horning down the tea, if the animal will not take it voluntarily; mashing a boiled turnip with the boiled chaff. Such is the nursing system to be pursued in all these cases when the febrile symptoms are allayed; and a diligent and patient use them in dietetics, I may say, is half the batt towards recovery.

CHAPTER XIII.

I will now take a glance at such cas noticed at end of last chapter, premising, before, that the acute stage has passed u observed or been neglected, and the secon ary stage just described has passed, and befo any remedial measures have been use debility will have set in, and very likely will joined with it profuse diarrhœa, or dysente of a very fœtid kind. Now, this stage is mo properly the typhoid form, although the oth is fast approaching to it, and this form stage of the disease is also the most trying deal with, and generally too often, althoug the treatment may be of benefit, the anim is left in a phthisical or consumptive sta that often defies all treatment whatever. Sti one need not despair, especially if the dige tive organs can be brought under control for it is astonishing how an animal wi feed, and ultimately make fair beef, co sidering the disorganized state of t lungs. The symptoms in this stage are e cessive weakness, pulse feeble and intermi tent; but I have observed that these sym toms vary according to the condition of t animal, and whether grazing or milking, an also to the state of the digestive organs. T pain is more strongly felt on pressure wi the thumbs between the ribs, the poor an mal will gasp—gasp, as if the breath w actually going—from the pain caused by doi so, and staggers again as if falling. The is also a peculiar cough, unlike any of th former I have endeavoured to describe; it hardly a cough nor a grunt; it is more like rumbling noise, quick, catching, like half cough, as if the poor animal wished to avoi coughing from the excessive pain it cause I could tell by this cough without seeing t animal what was going on, but I cannot d scribeit as I should like; it is a cough by itsel when once heard, and well fixed on the min it will never be forgot. The flanks have n the full, deep, quick heaving as before d scribed, but a half catching, kind of floatin

wavy heaving, as if the animal wished, as in the case of the cough, to avoid breathing altogether from the excessive pain it causes. The acute pain seems to me in this stage to have left the lungs and settled down in the pleura, as from such we would just expect such symptoms in the coughing, heaving of the flanks, and such acute pain. The diarrhœa is most profuse and fœtid, but this, like the pulse and weakness, as I have before remarked, greatly depends on the condition, &c. Now, as to the treatment, should the animal be low in condition (and it is astonishing how rapidly they waste away, as it were; but this depends greatly on the intensity of the disease, the previous chronic diseased state of the lungs prior to the acute attack of the pleura), with the pulse feeble and intermittent. The intermittent pulse is not always present, although in many cases it is; and you must be careful in taking the state of the pulse. It is not by holding a watch in your hand, and counting how many beats in a given time; it is the condition of the pulse that is the guide. If in a feeble state, and it was hard, wiry, small, I would bleed. There is also profuse diarrhœa, acute pain at the side. Keeping my fingers on the artery pulse for five minutes or so, and watching carefully the other symptoms, I have said to myself, "something tells me to bleed you; yet I am afraid (in such a case if we could only apply leeches, but they are of no use to us). Again, I should like to give you a full or half dose of physic. Well, if I give half a dose, I am not sure of its action one way or the other; if I give a full dose in your weak state, I am afraid it would be too much for you." No stated rule of treatment can be laid down here; my practice in such cases as this was to give the usual sedative draught, morning and night, and in the middle of the day the ammonia, sulphate of copper, spirits of nitre, ext. belladonna, and liquor ammonia acetatis, as before described. Apply blisters, setons to the front and sides of chest, and in many cases after inserting the setons, pour boiling water out of a kettle down the sides. The plan I generally adopted was to place a thick piece of woollen cloth or carpet on the flat part of the milking stool, pour the wa
between the stool and side of the chest cl
to the fore legs, and quickly, every mini
or so, press the stool and cloth to the si
holding the stool by its legs. Wh
the blisters have not acted to my mind, a
would have wished, I have then applied
boiling water, and with marked benefit; a
sometimes after the blister was well rubb
in, I have had a broad shovel made red h
and held it nearly close to the side over
blister as long as the animal would bear
I placed my dependence on altering the st
of the digestive organs and bowels, by dieti
and it is astonishing when you have subdu
the pain, fever, or inflammation, by counteri
tation and medicine as above, how soon th
are changed by dieting alone. After
diarrhœa is checked, and the fæces more p
taceous or thicker, if they still w
black in colour and fœtid, I never th
hesitated to give a full dose of physic
once, at the same time continuing
same dieting, which was as follows:—L
seed, well boiled to a jelly; a turnip
two sliced, boiled, and mashed; clover-ch
oatmeal, or crushed oats, or bean meal,
wheaten flour, made all together into porrid
and horned down if the appetite was gon
occasional handfuls of sweet hay or clov
plenty of oatmeal, wheaten starch gruel, va
ing each, one time the one, next the oth
and so on. Diligence, patience, and, I m
say, the constant use of these means w
work wonders. I may here remark th
farmers in general are very careless in
accustoming their cattle when in health
these diets occasionally, for when plac
before them when under disease, even if
appetite is somewhat good, not knowing wh
it is, they won't have it; it is a little troub
but it is worth all the time and the little ex
expense, but I am sorry to say such advic
very seldom acted upon. On the other ha
the animal may be in good condition, not
far wasted, nor so much apparent weakn
present, the pulse not so feeble, nor in
mittent, but of that hard, wiry, sm
feel under the fingers, the fæces so
what hard, or mixed hard and soft, w

the other symptoms described. Bleeding and physic are required here without any hesitation, following up the other treatment as this case may require. I may here state that the symptoms described as occurring in an animal low in condition, may happen in one which is in good order; the symptoms vary so, and likewise the treatment, that no precise or distinct line of symptoms or treatment can be laid down. One must be guided in the treatment by the prevailing symptoms.

I have given, to the best of my ability, a plain unvarnished statement of the general line of symptoms, and the practice I carried out in such cases, and without egotism I can say it was very successful, and I will now conclude by remarking, that many may say "he advocates *bleeding* in almost every case of disease, both of the digestive and respiratory organs." Nevertheless, in the course of my observations, I have given good grounds for the practice, and that the same is grounded on an extensive practical experience from my youth, long before I entered within the walls of the Veterinary College. I must confes in this I am very different from many practi tioners now-a-days. When a hint is given b a client as to the necessity of bleeding—"Oh we never bleed in such cases; that is the prac tice of the old school;" and when the gam is up, as a last resource, "we will try what little blood-letting will do." I have known, i some instances, that they got kicked out of th place, and pretty sharp, for the suggestion. Th same may be said as regards the application c hot and cold water externally to inflamed part: The theory, as learned at school, is all right but that theory without practice is somethin like the blind leading the blind. One mus be "a vet." in practice long before he goes t school, thoroughly conversant with his patien in health and disease; if not, a deal of mischi is worked before he learns to practise, and i many cases, his professional reputation is los and he must seek for fresh ground to settl down on. The pulse and the general sym toms are the points to be looked at, an without one is well up in these practically, h is lost.

THE HORSES IN THE UNITED STATES.

THE *New York Herald* gives some curious information respecting American horses. Our contemporary says:—"The number of the horses now in the United States will fall little short of 8,000,000 in the aggregate, and represents in money value the enormous sum of upwards of $2,600,000,000. Fifty years ago the standard price of horses as very low, $1000 being considered as nuch as a first-class animal was worth, unless n exceptional cases, notwithstanding we had ery much the same quality of horse then as now. Subsequent breeding has developed is powers in a different direction, and the loping saddle hack of that day has been ransformed into the trotting horse of the resent. We had at that time in this country une of the highest blood that had ever been imported from foreign parts. It was th rich and fresh, and became widely dissen nated throughout the country by such hors as Diomede, the winner of the first Englis Derby in 1780; his descendants, Sir Arch and Duroc, Messenger, and that most capit horse, Old Medley, to say nothing others that have left a favourable i press on the horse of the present da The Southerner, having no trotting vehicl and the roads being universally of inferi description, did the best he could under t circumstances, and trained his horse f saddle purposes. The North, where good roa and greater mechanical appliances prevaile soon possessed himself of fine road vehicle and the horse, instead of being taught to g lop and to amble, was encouraged in his tr until he became as conversant with that gait as he had been with other paces. A further impetus was given to trotting blood by the importation of the Arabian Grand Bashaw, who was a natural trotter himself, and imparted that peculiarity in an eminent degree to his descendants, and, in addition, communicating a graceful movement to a gait that had previously been considered not very elegant. We may say that the value of every other class of horse has been appreciated within the past few years, with the exception of the French Canadian, for whom there is very little demand—in fact none at the prices it would cost to import them from Canada. All over the country, the value of the horse has increased in a ratio corresponding to the high price of every other product, and may be set down at about double what it was before the war, with no prospect of a diminution.

As respects very fine horses they shew a constant increase in price. In 1850 the number of horses in all the States and territories amounted to 4,136,620, and in 1860 the computed number was 6,249,184. Notwithstanding the great loss sustained during the war, and the almost entire cessation of breeding in some of the states of the South during that time, the natural increase has been so great as to fully reach our estimate of 8,000,000. Ohio, Illinois, Indiana, New York, and Pennsylvania, took the lead as horse-raising states, and the probability is that they still retain it. The next great breeding sections are Missouri, Kentucky, and Texas. The war drew heavily on these States, but having four or five years to recuperate, there is no doubt they will shew a favourable amount of increase. Iowa, Michigan, and Wisconsin, were also large breeding States, and are yet so, their numbers having nearly doubled since 1860. In the Southern States, notwithstanding the devastations of the rebellion, there are more horses now than are required. There never has been a scarcity of ordinary horses. Much of the best blood, however, was captured during the war by the Union troops, and by this means many of the finest horses of the South found their way into the Weste and Middle States, where they have be turned to most profitable account in i proving the ordinary local or sectional stoc The Pacific States have also contributed th share to the general aggregate, Californ having, in 1860, but 160,610 horses, where now she numbers probably 500,000, t effects of the war on breeding not havi reached that remote region. Five million or five-eighths of the whole number of hors in this country, are animals devoted to t ordinary drudgery of horse life, and who individual value ranges from 50 dol. up 200 dol. There are two more classes, t first of which we will designate as horses general utility, and the second as fancy stoc the latter comprising the fast horses of t land. The first of these, the horses of gene utility, comprise nearly three-fifths of t whole, for they are not only the fast a stylish, but they are horses adapted, in majority of cases, to most of the useful p poses of life, including the coach, the expre waggon, and the road.

The action of agricultural and other societi in offering the large amounts they do annual for horses to compete at their exhibitio operates as a powerful incentive to the bree ing of fine horses, every breeder hoping to able to exhibit a Dexter, a Pocahontas, Lucy, or a Bashaw jun., to the gaze of a miring thousands, and carry off a premi which will enrich him for life. All this ten to greatly increase the number of horses bre and the great accumulation of national wea in that direction. The following are ab the prices paid for speed at the present day: A horse that can trot in 2m. 45s. will bri from 1500 dols. to 2000 dols.; a dashi good, young animal of square action w command 2500 dols. or 3000 dols., while well-bred one, say a Messenger or Basha for instance, that can trot in 2m. 35s., wit prospect of improvement, will be sought af at 5000 dols., and one of either of the abo stock that can beat 2m. 30s. is conside cheap at 10,000 dols., while for every seco in the twenties, 1000 dols. extra will be read given.

The Dairy and Poultry-Yard.

THE BEST BREED FOR DAIRY PURPOSES.*

THE Yorkshire is the largest and most numerous we therefore take her first. The Yorkshire, as we term her, is descended from the Holderness crossed with the Durham bull, but a different animal to the Teeswater or high-bred shorthorn. They are held in high estimation in and around London for the quantity of milk they yield, and, if well kept, at the same time making flesh for the butcher. An average cow of this breed, for several months after calving yields 20 quarts a day; while some have been known to yield from 30 to 40 quarts for months together. Some cows are supposed to yield from 4000 to 5000 during the year. It must be borne in mind that the food is of the most forcing description for the production of milk, without regard to quality—brewers' grains being a *sine qua non*. These cows form all the dairies of the midland counties; their milk is not rich in cream, yet on rich pastures or high feeding this is more than counterbalanced in quantity, and making beef at the same time, as we have had from the testimony of Mr Horsfall, Burley Hall, Yorkshire, who so explicitly described his mode of management in his papers to the Royal Society's *Journal*. I next advert to the Ayrshire; and I believe, taken as a breed, they are the most select as to milking properties. Ayrshire being a dairy county, the breed has been cultivated with the greatest care, and selected by distinguishing points known only to the initiated; and I hesitate not to state that we have no other class of cows, taken as a breed, that will produce the quantity of milk for food consumed. Hence the high estimation in which they are held in cheese-making districts. I shall give you one illustration. We have one small cow in our dairy (of said breed) who is called Victoria, now well up in her teens; for one season (pasture in the meadows only) for three months she averaged 26 quarts a day. We have records of much greater quantities than this, but she was a small cow, then only about 56 stones imperial live weight; so that every twenty-seven or twenty-eight days she produced her entire weight in milk; in short, she may be termed a milking machine. Even now, when in full profit, her bag seems as large as her body. I now come to the Alderney or Channel Island cows, which in their own island are most valuable, both for the quantity and quality of butter they produce. They are not much in favour in the eastern counties, in consequence of the higl prices which have to be paid for them when in pro fit, and their comparative small value to th butcher; and, moreover, our sharp east winds rathe tell on their delicate constitution. When kept, it i mostly by private gentlemen for family use. The yield a fair quantity of milk, which is very rich i cream and produces excellent butter. In their ow island they are reported to yield from 10 to 12 lb. c butter a week during the summer; that result is ver seldom obtained in this district, unless under ver favourable circumstances. In the West of Englan they are greater favourites than with us. Howeve W. Fisher Hobbs, Esq., of Boxted Lodge, ha favoured me with the following account of two cow kept by him of the same breed. He writes as follows —"At your request I send you a correct account the produce of two cows (Alderneys) which I kept my own residence, Boxted Lodge, in 1861. I had n other cows there during that time. You will obser that the produce from these two cows was kept sep rate, from the period of their calving until the 12th July. After that time the cream was mixed. Tl total produce of these cows in thirty-four weeks w 860 lb., besides what cream was used in my house this being an average of 25½ lb. for the two cows durir the thirty-four weeks. You will observe Mr Hobl states that the milk was kept separate, from the perio of calving until the 12th of July. For 14 weeks pr vious to the date one cow averaged 17½ lb., and o week 20 lb. 1 oz., a quantity (for the length of tim be it remarked) I am not aware has ever been ol tained from a cow of any other breed. So much f the Alderneys.

We shall now briefly refer to the Suffolk. The are many gentlemen present in this room wh are better qualified to give an account of the Su folk cow than I am, from the short period that have been amongst them, and I shall be glad to he them this evening. However, we have records of polled breed of cattle in Suffolk for about 200 year but of what shape or form we are left to surmise. I my opinion, at no distant period, they have bee crossed with the old Aberdeen, to which the be animals of the present day bear a striking resen blance. Blood red is now the favourite colour, wit little or no white, unless the tips of the tails but they have been so indiscriminately cross latterly, with all sorts of brutes which could t called bulls, that, in consequence, we have near

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A paper read by Mr Horn before the Eye Farmers' Club.

lost the original stock. In short, since the dispersion of the late Sir E. Kerrison's stock, it has been difficult in this district to find pure animals to breed from ; and I wish to impress upon my dairying friends that it is just as essential, in order to obtain good milkers, that the male should be descended from as good milking stock as the female. Most people are careful as to the milking properties of the cow they breed from for the dairy, but the bull is seldom taken into consideration ; and it somewhat surprises me, considering the haphazard manner in which they have been bred, how the Suffolk cows have still kept the milking properties for which they are justly celebrated. We have obtained 24 quarts a-day from a Suffolk cow when in full profit, and I presume my dairying friends will not term them useful unless they yield from 18 to 20 quarts a-day when in full profit. They are better adapted for the arid climate, rough and badly-farmed pastures of the eastern counties, than any other breed. They yield a good quantity of milk, and when properly fed, their milk is pretty rich in butter. Taken as a breed, their skins are coarser than either the shorthorn or Ayrshire ; in consequence, they are not so sensitive of flies ; and, moreover, being without horns, they are more suitable when in yards. Likewise, they are favourites with the Society for the Prevention of Cruelty to Animals, as they cannot inflict severe torture on each other ; and when crossed with a proper shorthorn bull, produce a good animal for fatting purposes. And further, we have the testimony of Mrs Rainer, Thorpe, confirmed by other eye-witnesses, of her polled cow producing in one week 19 lb. 15 oz. of butter, and for weeks in succession 18 lb. 12 oz., and for nine months 11 lb. 4 oz. was the average. Mrs Rainer had only this one cow ; but to use her own words, she "treated her like a child." Again, we have the late Mr Lingwood's cow at Brome, which produced 16 lb. 4 oz. in one week, and for weeks averaged 15 lb. She was also a single cow, kept by a private gentleman. Mr Horn next proceeded to shew the most profitable modes of disposing of the dairy produce, and then said—I have thus endeavoured to bring under your notice the different systems that are practised in other districts. I have stated results which have been, and may be, realized with proper management, and one naturally begins to wonder why Suffolk, once so prominent in dairy management, is now getting into the shade ; the complaints are loud and long that no dairymaids are to be found. Again, some maids maintain that there are no places for them to learn, as no one will take the trouble to teach them. But they are not easily taught who don't want to learn ; and as crinolines and feathered caps are more in unison with nursery - maids, table-maids, and housemaids, the washing, scrubbing, working, rosy-cheeked dairymaid of old is nowhere to be found. We are told that cleanliness is next to godliness ; and in no case is it more applicable than in dairy management. Morning and evening, Sunday and Saturday, twice a-day, the dairy must be attended to ; for, be it remembered, it is only first-class article which commands attention in t market. We now come to the last branch of o subject, and one on which I doubt not all of you a familiar—converting the cream into butter ; a ve simple, but at certain seasons, with certain feeding, very ticklish operation. I shall give you an outli of the system we pursue. During the winter our co are fed on roots and chaff in conjunction ; the fi part of the season on Scotch yellow turnips or swede after Christmas on mangolds. Those in full profit r ceive about 4 lb. to 5 lb. of cake or corn in additic It is when fed on roots that the care and experien of the dairy-maid are put to the test to produ a good article. Our dairy people maintain that we send the milk into the dairy free from taint, th will produce butter agreeable to the palate ; ther fore, when the cows are on roots we invariab use a small quantity of saltpetre, put into t milk warm from the cow, in order to dispel any effluviu the roots may produce. Care must be taken not use too much ; if so the butter will taste rancid ; say ounce to every 30 gallons. We shall now go into t dairy, and, to use an Irishism, we don't allow t butter to spoil before it is made—that is, stale vess taint the milk, or stale milk taints the cream, a tainted cream will not produce first-class butter ; a as our object is quality before quantity, our custom being rather fastidious in taste, we must endeavour produce a sweet article. The milk is first creamed twenty-four hours, and again at thirty-six ; in so doir both milk and cream keep sweeter than if only on creamed at thirty-six. We churn twice a week. W use no artificial colouring. Our spare butter goes to "West-end Miss," at prices varying from 14d. to 17 per lb. There are many *ifs* and *ands* in order make good butter when cows are fed on roots ; b the dairy-maid claims them as her knowledge of t art, and which would be tedious to describe. Gent men's dairies are in unison with "home farms Neither are proverbial for large profits. Howev while our injunctions are to produce a first-class arti we at the same time have an eye to profit. Our da of milk cows are twenty-four, and they cost us f dairying and attendance 24s., or 1s. a-head per wee and on examining our dairy book for 1862, after d ducting said labour, I find a credit of £10 standing t each cow. Be it remembered, we wean a calf for ea cow in addition. In the foregoing observations I ha endeavoured to bring under your notice the breeds cows best adapted for dairy purposes ; thus we find t Yorkshire the favourite where pastures are rich a quantity required. And again, in the western pa of our island, where cheese-making prevails, we fi the Ayrshire the universal favourite ; and when or cream and butter are required, we find the Aldern in esteem. It is said—"Ireland for the Irish," and w must say "the Suffolk cow for Suffolk," for after trial of all the breeds I have named, it is found by e perience in our establishment that they are the co best adapted for the district.

FINE FLAVOUR IN BUTTER AND CHEESE.

AT the annual meeting of the Canadian Dairymen's Association, held in Ingersoll last month, Mr Willard spoke on the important question, how to secure choice flavour in butter and cheese :—" With all our knowledge and experience in New York we have not been able the past year to avoid having some bad, off-flavoured cheese during the hot weather, especially in July. I took some pains to study this question, and I found by examining farms in numerous instances, that stagnant, putrid water was one of the leading causes. There was other causes, but this one was invariable. In one instance, the cause was attributed to the milk of one of the patrons, whose cows had been drinking from frog ponds; this man changed his fences so as to get good water, and so the trouble ceased. In the private dairies of New York and England, particular attention is paid to this matter. I wish I could impress this thought upon every dairyman present, as it is one of the faults which will have to be corrected before the highest standard of excellence can be reached. On farms where springs are deficient, the defect is to be overcome by digging a well, and applying wind power for pumping, which can be inexpensively erected, and made durable. Another point on which the old dairy farms are in error and which is the cause of great impurity in milk, is the bad construction of milking stables, most of which are little better than pest houses, owing to bad ventilation. So bad are some of them that I have seen delicate women faint away in them in hot weather. Follow the milk which comes from these places to the factory, after having been confined in the can under a close-fitting cover, and you will find it most offensive in colour and putrid. If there is any manufacturer present who can make clean flavoured goods from such milk, I should like to see him and hear his process. In this respect the English farms are ahead of ours. Their milking stables are open on one side, cool and well ventilated, and milking is made a pleasure to animal and milkmaid. I must say the new dairy districts are in advance of the old in this respect [illegible] beg of you not to fall into the errors of the old dairy districts. After you have provided a clean, well ventilated milking stable, let each milker take a pail of water and towel into the stable, wash the cow's udder, and wipe it dry with the towel, and then proceed to milk; you will then have no filth dropping into the pail, and water is so cooling and grateful to the animal, that she is quieted, gives down the milk at once, and will yield enough more during the season to pay the whole cost of milking. On the subject of milking, Mr Willard gave a description of the structure of the udder, and then went on to say: Preparatory to milking, the teats ought always to be well washed with a sponge and cold water. This is not only a cleanly habit, but it keeps the teats in good order, and frequently prevents inflammation, and in certain cases restores the flow of milk by warm applications. A cow that has always been treated kindly will generally stand quietly, and appears to enjoy the operation. Milking should always be done by one and the same person, and I am in favour of women as being more tender, cleanly, and more patient of temper than men. Heretofore attention has been chiefly directed to the manipulations of cheese and butter making, now the necessity of having good milk is forcing itself upon us. To ensure the delivery of pure, sweet milk, he urged the Convention to adopt the following rules, to be posted on the door of every factory, and addressed to the patrons :—

" The unanimous voice of the Dairymen's Convention of 1869 is :—

" 1. That no milk is good which is made from filthy, stinking waters of slough and frog ponds. 2. That no milk is good that comes from cows dogged or over-driven, in hot weather, from the pasture to the stable. 3. That no milk is good that comes from cows pounded or kicked and cruelly treated by bruta men. 4. No milk is good that comes from diseased cows—cows that have sores filled with pus, or tha have udders broken and running with corruption. 5 No milk is good that comes reeking with manure and filth from the stable."

TH[illegible]ES FOR POULTRY.

T[illegible] very unseasonable and inclement weather we have had of late has driven us into the necessity [illegible] providing an increased amount of accommodation in the form of covered retreats for our fowls. The consideration of the subject suggests a variety of applications suitable for the purpose, either for the farmer or the amateur. the foremost of which is prompted through fears for the safety of the hay crops although a very considerable quantity of grass i already cut and lying about in all directions, and pro prietors and men scarcely know which course to pursue fo the best, either for the safety of crop on the ground, o when stacked, we very much fear that unless promp and judicious measures are adopted that large quant ties of hay will be spoilt in the stack; and we specially recommend to the notice of those interested, Messrs F. and F. Crooks' method of ventilating ricks of all kinds by horizontal and vertical shafts passing through their centres, which will to a very great extent prevent them from over-heating, taking fire, or becoming mouldy and rotten, and no better than the very worst manure. Now the correct principle to be adopted in preparing the bed of the stack (or, as they say in the west, the *staddle*), is to raise it from the ground upon iron stack pillars, made for the purpose, and placed at respective distances from each other, upon which a strong framing of woodwork is placed to receive the faggots or bavins; or, the more finished and most lasting are the entire posts and frames made in iron, which are to be had at a moderate price. The posts vary in height from 20 to 28 inches, it will be readily understood that by thus raising the bottom of the stack from the ground that a very convenient, warm, and dry retreat presents itself, and which can be readily made available for poultry for three distinct departments in their management. The plan of building stacks upon frames is of course a very old one, but the idea of turning the space under the stacks into coverings for hens and chickens we have never before seen adopted; and as the pitch of the thatch with its overhanging sides most perfectly throw off the rain, one of the very best retreats for the purpose offers itself, and we very much regret that we could not get an engraving illustrating our ideas in time for this week, but as the subject appeared to be of such importance to those who make hay, and as so little of the haymakers' bright weather has been seen ately, we would not delay our remarks on that account. We have, however, other ideas in connexion with this part of the subject, which we will here observe that the second use to be made of a portion of this covered space is the retreat it provides for the adult fowls. It must be borne in mind by persons keeping poultry, that there is as much necessity for guarding them from the direct rays of the noonday sun as from rain or wind. We know of a great number of breeders who have lost quantities of birds of all ages and all varieties from sun-stroke, last summer especially. It will of course be said by many of our readers that they have not the privilege and pleasure of making hay, and applying our hints to the purpose. Many will no doubt have their birds turned down, probably in an orchard or paddock. In either case due provision must be made for their protection, and, if possible, small game coverts formed by planting some of the hardy rhododendrons or other branching shrubs, which offer capital sheltering places from light showers and excessive sun. In addition to these, close sheep hurdles upon which some good straight straw is laid about 2 inches deep, and sewn to the hurdles with strings, forming what brickmakers call straw shutters. A row of these resting with one end upon the ground and the other end raised at the front about 30 inches, supported by a firm stake which must be thrust into the ground a few inches, will also form a very clean and comfortable shelter, under which both old and young will gladly resort when wet or very hot, and the more venturesome of the youngsters will scramble up to the top; and, if the weather is not too scorching hot, they will open their wings, stretch out their growing limbs, and sun themselves, with evident gratification.—*Land and Water.*

The Country Gentlewoman.

ON THE PRODUCTION OF COLD, PARTICULARLY OF COOLING LIQUIDS.*

IN using a freezing mixture for ordinary purposes, it is sufficient to put it into a wooden vessel as a bad conductor, and then to place in that the vessel containing the liquid to be cooled. But when the most intense cold is wished for in an experiment, the vessel containing the mixture should be placed within another a little larger, being supported by corks, and covered over with woollen cloth ; the air in the space between the two vessels, being a non-conductor, prevents the heat of the apartment from finding its way to the mixture, which, therefore, is obliged to rob the liquid to be cooled of its caloric.

This mutual action of snow or ice and salt upon each other is well illustrated by the common practice of sprinkling salt upon a pavement that is coated with ice. The salt and ice soon dissolve and run off as liquid brine, or it may be swept off.

Mr Walker, of Oxford, made a number of experiments in the production of cold by various frigorific mixtures, and the results are published in the *Philosophical Transactions* for 1795 and 1801.

Mixtures of Salts without Snow.

Mixtures.	Parts by Weight.	Temp. falls from 50 deg. to
Muriate of ammonia	5	10 deg.
Nitre	5	
Water	16	
Muriate of ammonia	5	4 "
Nitre	5	
Sulphate of soda	8	
Water	16	
Nitrate of ammonia	1	4 "
Water	1	
Nitrate of ammonia	1	—7 "
Carbonate of soda	1	
Water	1	
Sulphate of soda	3	—3 "
Diluted nitrous acid	2	

Mixtures.	Parts by Weight	Temp. falls from 50 deg. to
Sulphate of soda	6	—10 deg.
Muriate of ammonia	4	
Nitre	2	
Diluted nitrous acid	4	
Sulphate of soda	6	—14 "
Nitrate of ammonia	5	
Diluted nitrous acid	4	
Phosphate of soda	9	—12 "
Diluted nitrous acid	4	
Phosphate of soda	9	—21 "
Nitrate of ammonia	6	
Diluted nitrous acid	4	
Sulphate of soda	8	— 0 "
Muriatic acid	5	
Sulphate of soda	5	— 3 "
Diluted sulphuric acid	4	

Mixtures of Salts with Snow.

Mixtures.	Parts by Weight.	Temp. falls to
Muriate of soda	1	—5 deg.
Snow	2	
Muriate of soda	2	—12 "
Muriate of ammonia	1	
Snow	5	
Muriate of soda	10	—18 "
Muriate of ammonia	5	
Nitre	5	
Snow	24	
Muriate of soda	5	—25 "
Nitrate of ammonia	5	
Snow	12	
Diluted sulphuric acid	2	—23 "
Snow	3	
Concentrated muriatic acid	5	—27 "
Snow	8	
Concentrated nitrous acid	4	—30 "
Snow	7	
Muriate of lime	5	—40 "
Snow	4	
Crystallised muriate of lime	3	—50 "
Snow	2	
Fused potash	4	—51 "
Snow	3	

The snow should be just fallen dry, and un compressed.

By first cooling the materials before the were mixed, through immersing them in othe frigorific mixtures, Mr Walker obtained a de gree of cold 100 deg. below zero, the greatest degree of cold ever produced.

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*Concluded from page [illegible]

A method invented by Professor Leslie of producing artificial cold, and freezing water, depends upon the principle that water evaporates much more rapidly when the pressure of the atmosphere is withdrawn, as in the exhausted receiver of an air-pump. If some material be included in the receiver that absorbs vapour, the evaporation will proceed with still greater rapidity, and consequently a greater degree of refrigeration will take place. Sulphuric acid, which has a great absorbent power, is poured into a shallow dish to the depth of half an inch, in which is placed a small vessel with water that has lost its air by boiling; the whole is then placed under the receiver, and most of the air extracted. By the rarefaction of the air the water evaporates very quickly, and its vapour is absorbed, as it forms, by the acid, so that, in a few minutes, the remaining water is frozen into a solid mass. The loss of water seldom amounts to a fifteenth part, nor is it till after repeated use that the sulphuric acid becomes so weak as not to affect the absorption. The acid can thus effect the congelation of more than twenty times its weight of water.

Mr Leslie varied this process by substituting pounded trap-rock, well-dried before the fire, instead of the sulphuric acid. This powder, by the same property of absorbing aqueous vapour, was able to freeze the sixth part of its weight of water. He also found that parched oatmeal was a convenient and powerful absorbent; and by means of the air-pump with a body of oatmeal of a foot in diameter, and rather more than an inch deep, he froze a pound and a quarter of water contained in a hemispherical porous cup. The oatmeal, which is less hazardous than acid to those little used to experimenting, is easily dried and restored again to the same action. It would appear from this experiment that, with an air-pump, it would be easy to procure ice in a hot climate, or at sea.

This method of keeping the air in a vessel constantly dry by an absorbent substance is not only useful in producing cold, but also in drying many articles; and it has lately been in much use for the latter purpose.

The principle of preserving ice itselt depends upon surrounding it with what are termed non-conducting substances, or substances which heat cannot pass through. This is necessary in order to defend it from the common air of a temperature above the freezing point, and from moisture or water, which must necessarily be warmer than 32°.

If ice could be kept always from the contact of other bodies of higher temperature than itself, or be surrounded by substances which heat could not pass through to reach it, it must always remain in the same state. But we know of no substances that are absolute non-conductors, and certain bodies receive that name only because heat passes them with very great difficulty. The substances of this kind are chiefly air, water, and materials of loose and porous texture, as wool, straw, charcoal, cork, wood, &c. Metals and hard stones allow heat to penetrate them with most facility, and consequently they are conductors of heat.

The method of transporting ice and snow to a distance is very simple; it is only necessary to inclose them in some substances that are good non-conductors, as chaff, straw, wooll, &c.; and if the package be put into a box an inch or two larger, and wedged in with pieces of cork, this would be a still further security when the quantity is small. It is in this manner that the Neapolitan peasants carry snow from the repositories on Vesuvius to Naples during the heat of summer.

Ice preservers are chests of stout deal lined within with cork, as being a bad conductor of heat; into these a quantity of ice is put, to prevent going frequently to the ice-house. Ice may be kept in them fcr three weeks, in summer. If cork cannot be got easily, the sides of the ice preserver may be made double, with a space of two or three inches between, which space should be filled with charcoal reduced to powder, than which no better non-conductor is known.

Ice pails are likewise kept for iceing creams, cooling wines, butter, &c.

Ice may be kept in the open air for a year, by making a pile of it on dry ground (the north side of a hill is the best place) in a steep conical form of considerable size in winter during a hard frost, and covering it over, first a foot thick with a layer of fagot wood, then with another layer of straw, and lastly thatch. This should be placed on an elevated mound, or platform, raised on purpose that the water may drain off from it. If shaded by trees, or a shed roof, so much the better. If the pile be sprinkled occasionally with water while it is building, in frosty weather, the water will, by freezing, cement the masses of ice together, and make them last longer. The steeper the conical pile is made, the better.

Ice may also be preserved in cellars, which should have no windows, and be provided with double doors. The floor and sides of the cellar should be lined with straw; or a better method would be to form a framing of bars of wood for the floor and sides, insulated, and covered with straw.

ICE-HOUSE.

It has long been the custom here to connect the subject of an ice-house with that of the dairy; and where the former is entirely detached, and at some distance from the house, the two may very properly be associated. The most usual mode of constructing an ice-house is the following:—

A well is sunk in the ground in the form of an inverted cone, which is lined with brick-work, of a brick and a-half thick, and arched over. Into this the ice is put, through an opening left in the top of the arch. A door is made on one side for taking out the ice, or putting things in, and a drain is constructed from the bottom to carry off the water which s formed by the melting of the ice in summer. The advantage of the conical form of the well s supposed to be, that as fast as the ice thaws, he remainder slides down the sides of the one, and still keeps in a compact body. Another advantage is, that the circular form of he cone is stronger than a square or any ther shape, thus resisting better the pressure [illegible]

Some recommend to have the brick lining double, with an empty space between, to form a more complete non-conductor of heat; bu this additional expense is unnecessary unde ground. The draining is essential, some ice houses failing through want of attention to it.

The walls of the cone should be built with Roman cement, or at least with very goo mortar that will set hard. To support the ic at bottom, it should be placed on a strong wooden grating, or what is found to answe very well, an old cart-wheel, being very strong from its form; this permits the water produced by the partial thawing of the ice t pass off into the drain; the latter should hav a trap to prevent the external air from communicating with that of the ice-house. Shoul the situation of the ground not admit of a drain being carried out from the bottom o the ice-well, it may terminate in a small well sunk deeper to receive the water; and as this water will always be ice-cold, it may be raised up when wanted for cooling wine, butter, &c. by a small pump placed in the porch of the ice-house.

The door for taking out the ice should be double, with straw stuffed between both; and the same precaution should be used with the aperture for putting in the ice. There shoul be a long passage leading to the door, having in it two more doors. In the space between there may be an ice-cold room; and the space between is to admit of the door being shut before the door of the cold room is opened, to hinder the access of the external air. The top of the ice-house may be finished in various ways. It may be covered over with tough clay and then with earth, and planted with shrubs as a mound; or it may appea as a low building covered with plenty o thatch. The closer the ice is packed the better.

An ice-house may be formed above ground, by building the walls and arched roof double, a foot apart, the better to keep the heat; and the whole may be thatched, or covered over with giant ivy, or some other creeping plants. The ice should be laid hollow with a drain from it, and all the precautions above-mentioned taken. When ice cannot be had, snow packed and beaten down well may serve as a substitute.

A succedaneum for an ice-house may be made as follows :—Take an iron-bound butt or puncheon, and knock out the head; then cut a small hole in the bottom, about the size of a wine-cock; place inside of it a wooden tub, having a similar hole, resting it upon three pieces of wood, which are to keep it from touching the bottom; fill the space round the inner tub with pounded charcoal, and fit to the tub a cover having a convenient handle; place on the lid a circular flat bag of pounded charcoal, about six inches thick, that will cover it entirely, and over all put another wooden cover. When this apparatus is prepared, bury it for four-fifths of its height in the earth of a cold cellar that is dry, keeping it a few inches from the earth at the bottom by means of pieces of bricks. Fill the inner tub nearly with ice or snow beaten hard down, leaving room to place any vessel holding the subtances to be iced. When the cover is taken off to place these in, care must be taken that it be replaced when the iceing is finished; the congelation will in general be effected in half an hour.

In London, ice is sometimes supplied to the confectioners almost daily in the summer from ice-cellars kept by persons who make this a business, and carry the ice round to the shops in carts. The ice is then put into a large tub in the cellar. The ice creams are made there in pewter vessels about a foot in depth and three inches in diameter; these are brought up into the shop, and placed in a wooden reservoir full of ice, with a cover, to supply customers.

Ice-cold rooms would be found useful additions to the domestic offices of a mansion. They might be connected with the ice-house, which should be considered as the focus of cold, and should always have double doors, double windows, and the walls should be built hollow for the purpose of preserving an even temperature. A small inner room might have a well to contain ice; thus several degrees of cold might be obtained by different apartments. The usual idea of an ic house in England is, that it must be detached building at a little distance fro the house; but, though this situation h some advantages, yet it is not absolutel necessary; and it might often be more co venient to connect it with the pantries, or place it in a cellar to which access mig easily be had.

There are some curious facts respectin the freezing of water, which, although n essential to our subject, it may be interestin to notice. This process begins by numero minute speculæ appearing and shooting acro the surface of the water, and always makin angles with each other of 60° and 180°; these accumulate, the ice becomes more soli but its specific gravity is always one-ninth le than that of water, in consequence of which floats. Water in cooling becomes more dens not at the freezing point, 32°, as might expected, but before it arrives at that poin as at about 39°; and in cooling still furth down to 32°, it actually expands, so as to at the same degree of density as it was 35°, expanding equally by cooling or heatir below or above 38°. If water be expose to cold and agitation, it cannot be coole below 32° without freezing; but if the wat be kept quite still in a large vessel, it may cooled down to 25°, considerably below t freezing point, without becoming ice; if, ho ever, any tremulous motion takes place, instantly freezes, and the temperature th suddenly rises to 32°. If water be confine in the bulb of a thermometer, it is ve difficult to freeze it by any cold mixture abo 15°; but, if the cold be below that, it ca not be prevented from freezing. Wh cooled down to 15°, the water in the bu remains perfectly transparent; but, if it ac dentally freezes, the congelation is insta taneous, the bulb becoming in a mome opaque and white like snow, and the ice projected up into the stem. The freezing water is an actual crystallisation, and the facts depend upon the laws which regula that natural process.

The expansion of ice in forming is a ph nomenon of great importance, and is att buted to the mode of the crystallisation, and not to the ice inclosing air; for water parts with its air in becoming ice, and on this account it is that water freezes sooner for having been boiled. Boiled water affords the most compact and beautiful ice.

Water which has just been produced from melted snow or ice is very nearly as cold as the ice itself before it began to thaw; for although it may be easily supposed that it must have imbibed much heat in order to thaw, yet, by a singular fact in the economy of nature, this quantity of heat is not rendered sensible to the thermometer—a fact not only extremely curious, but very important to be understood. It is well known that ice may be much colder than the freezing point, but that when its temperature rises to 32°, it begins to melt; it melts very slowly, and is imbibing heat the whole time; and yet, if the thermometer be put in among the thawing ice or snow, it will still indicate only 32°, nor will any difference be perceived until a short time after the whole has been thawed; so long as any ice remains unthawed, no addition of heat will be perceived: what, then, has become of all the heat that has undoubtedly been aborbed by the ice?—that heat has entered the ice, but only for the purpose of converting it into water; and it remains in the water in what is called a *latent* state, so intimately combined with it that it cannot be separated, and is, in fact, essential to keep the water in its fluid condition; if the water be deprived of this heat it freezes; but though the heat is given out again while the water is freezing, it is immediately carried of by the atmosphere, and diffused, so as not to be felt. It is this gradual absorption of so much heat by melting ice, that makes a thaw often colder than a frost.

Cold has been imagined to be something positive, like heat, and that there are rays o cold like those of heat; but this is an error Cold is, in fact, nothing more than a very low degree of heat or temperature.

THE

COUNTRY GENTLEMAN'S MAGAZIN

SEPTEMBER 1869

STABLES—THEIR ARRANGEMENT AND MANAGEMENT.

WHILE considering the high value of the animals which are housed in them, it certainly is matter of surprise that stables and other kindred buildings have been heretofore run up in almost total defiance, or at least with supreme indifference to, the best methods of securing scientific and economical arrangements. If it is true that the inferior animals have certain important functions to perform, and that their health depends entirely upon the mode in which such functions are carried out—surely it is no less true that the wisest course of procedure is to make all arrangements a matter of the first importance, which have for their end the maintenance of laws, the proper operation of which is the best conducive to the health of the objects subjected to their influence. Thus, in the case of cow-houses, where, owing to defective arrangements, disease and great mortality often exist among the animals, their owners, or parties interested, lose themselves in conjectures as to the cause, forgetting, or rather being ignorant of the fact, that so surely as effect follows cause, so surely does disease and death follow upon the neglect of those appliances and arrangements which enlightened reason, aided by science, points out as essential requisites in structural arrangements. And as with cow-houses, so with stables. Were the amount yearly lost by deaths of horses, and by disease amongst them, in consequence of defectively c
structed buildings, to be carefully calculat
the result would be strikingly illustrated
the above considerations. The horses,
example, in a certain barracks died in am
ing numbers, and without any apparent cau
On investigation by competent parties, cert
changes were made in the structural arran
ments, and the mortality at once ceased. T
desideratum in this case happened to l
efficient ventilation. In the great major
of stables there are, however, in addition
want of fresh pure air, many other
fects. It may be said that many gent
men's stables are constructed having eve
essential requisite to ensure healthy arran
ments. True, there are, and they may
looked upon as steps in the right directic
but they are the exception, not the rule. \
should like to see proper measures in
cases carried out, and that such can
easily, and what is of more value, econor
cally effected, our remarks will, we trust,
able to shew. It is astonishing the degr
of ignorance which prevails amongst build
(and even many architects), as to what shou
constitute the proper arrangements of stabl
and cow-houses. We were once called up
to examine the stables attached to a mag
ficent country seat. Thousands of poun
had been laid out upon the house a
grounds, and not a little money upon t
architectural arrangements of the stables; l

notwithstanding all this outlay, in addition to the expense of painting the interior, the stables were most unhealthy, and not in one instance or point scarcely, had the architect shewn that he had paid attention to raising a healthy structure for the very valuable animals which the wealthy owner retained in his establishment. While strongly advocating the raising of handsome structures, and of carefully finishing the interior of stables, we should also like to see some attention paid to proper healthy arrangements. Unless animals are placed in circumstances congenial with their habits and necessities, it is in vain to look for any benefit or profit from arrangements, however expensive and complicated these may be. That such strictures are not uncalled for, even with all the improvements which confessedly have been made of late years, we have sufficient proof in a recent Report presented to both Houses of Parliament, on the Ventilation of Cavalry Stables. In these, one would have safely enough predicted that the best arrangements, constructions, and fittings would be seen; yet, after examining in detail the various plans throughout the kingdom, which might be taken as representative plans, the commissioners state that this examination strongly impressed them with the necessity of a more extensive knowledge of the laws of health being rendered available for the public service. They characterize the above class of stables, although quite as good, or perhaps better than private stables of the same date, as contrivances for [illegible] subjecting [illegible] of horses to [illegible] necessity [illegible] -ning air contaminated [illegible] -ations [illegible] horse [illegible] feet;

the length from front of manger, *c c*, to the e of travis board, *d d*, 9 feet as a maximum, 8 fe as a minimum. The width of the gutter, *e* one foot; of the space between, *g g*, t

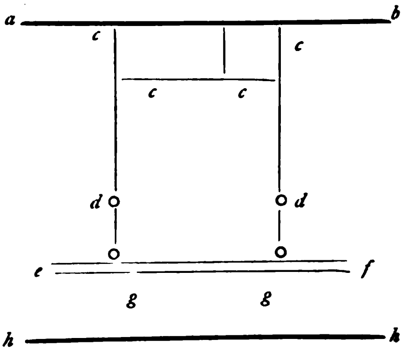


Fig. 1.

gutter and the front wall, *h h*, 7 feet. T width of the stalls, from *d* to *d*, 6 feet. If flat ceiling is employed, as in cases whe apartments are placed above the stable, t height should not be less than 10 feet, but 1 will be better. But flat ceilings should avoided, and open sloping roofs adopted (s after remarks upon ventilation). In this ca the height of the walls up to the springing the roof should not be less than 11 feet, wi a rise of roof, equal to one-third, at the leas of the span.

A few remarks on these dimensions may given here, for with many it is contende that some of the dimensions here given a too great.

Width of Stable from wall to wall.—A widt very usual and greatly recommended by som is 16 feet in the clear. Now, if from this taken the space occupied by the hay rac length of stall—this at 8 feet—the minimu length and width of gutter, a space of 5 fe is left. From this 2 feet must be deducted f [illegible] occupied by the harness, which [illegible] brackets or saddle pieces, projec [illegible] so that 3 feet only are le [illegible] move too and fro behind th [illegible] wheel a barrow, and use th [illegible] and broom.

‘No wonder,” says Mr Stephens, “when s [illegible] room is given to work in, that cleanl ness is so much neglected in farm stable and that much of the dung and urine are le to be decomposed and dissipated by heat, in the shape of ammoniacal gas, to the probable injury of the breathing and eyesight of the horses when shut up at night.

Width of Stalls.—Here, again, the width we have given, as that which should be adopted, is thought by many to be extravagant, being more than the usual width. On this point, the same authority just now quoted, has the following :—" A narrow stall is not only injurious to the horse himself, by confining him peremptorily to one position, in which he has no liberty to bite or scratch himself, should he feel so inclined, but it materially obstructs the ploughman in the grooming and supplying the horse with food. No work horse, in my opinion, should have a narrower stall than 6 feet from centre to centre of the travis, that he may stand at ease or lie down at pleasure with comfort.

Position of the Stalls.—For a long time it was the practice almost universally to arrange the stalls as in fig. 1 ; but another plan, possessing many advantages, is illustrated in fig. 2, where a passage, *a a*, is placed at the head of the stalls, *b b*, which the attendants pass in feeding the animals. The following on this arrangement is from a good authority :—

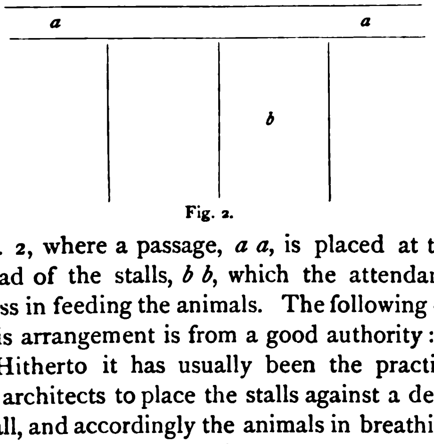


Fig. 2.

"Hitherto it has usually been the practice of architects to place the stalls against a dead wall, and accordingly the animals in breathing are compelled to re-inhale the corrupted air which, on leaving the animal, is obstructed by the wall. In the injurious effects which result from the ammonia of the manure coming into contact with the line of the building, and affecting the eyes of the horses, we see another objection to this mode of placing the stalls. A wall at a little distance from the horse's head, especially if it happens to be an outside one, must, by its condensation or foul vapours, and the obstruction of circulation, greatly add to the impurity the whole interior."

It is generally admitted that cattle sta arranged with a central feeding passage, preferable to those having a wall in front them. It has been alleged, no doubt, that cases where cattle in two ranges are plac head to head, with only a 5-feet passage tween them, there is some risk in the ev of contagious diseases breaking out, of being rapidly communicated from one anin to another in the act of expiration. Wh the ventilation is very defective, the foul air from the lungs of the animals facing ea other will fill the whole open space in fro but if an infectious disease once gets into byre, it will soon pervade every part of whatever way the cattle stalls may be arrang If cow stalls having a front feeding passa are found of advantage in facilitating labo in supplying the animals with food, and some degree promoting ventilation, the sa arrangement ought surely to be adopted stables, where these advantages are of s greater importance.

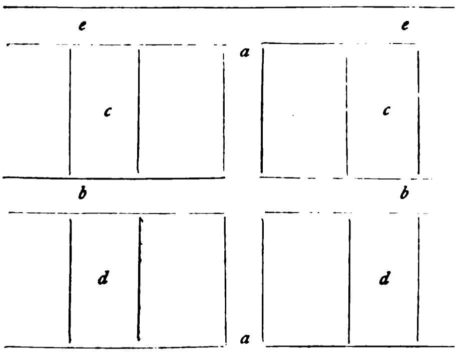


Fig. 3.

In the Report of the Royal Commission already alluded to, a plan of a " model stabl is given, which we illustrate in the follow rough type diagram, in fig. 3 : *a a* are centre doors, *b b* a centre passage 14 f wide, between the two rows of stalls. T extreme width from wall to wall is 33 f The height of the walls 12 feet. There an open roof, the total height, from ridge which is 20 feet 6 inches. Each horse thus a space of 100 superficial feet, a 1605 cubic feet of breathing space. T arrangement would, we think, be very considerably improved by having feeding passages at the heads of the stalls, as shewn in the sketch at *e e* fig. 3.

This last arrangement will admit of windows being made at side, which is a matter of very great importance—*a good supply of light exercises an important influence over animal life.* Another beneficial advantage to be derived from the arrangement of the stalls is, that if the partitions at the head of the stalls are provided with apertures, food may be placed in the manger or water in the troughs by opening this door, without disturbing the animals, as is the case in stalls as generally placed. The importance of this need not be here dwelt upon; it is sufficiently obvious. Over *c c* in the sketch, fig. 3, are the passages running behind, and at the end of tl stalls.

Drains and Flooring.—The drains for co veying the liquid manure to the tanks or r ceptacles prepared for its reception, are a ve important feature in a well constructed stabl It is not necessary for us here to enter furth into the importance of this point. Grantir that the liquid is of no value to the ag culturist or horticulturist (an assertion, by th way, which not even the most sceptical in suc matters would now dare to make), it is matt of great importance that it should, with a du regard to the animal's health, be at once r moved, so that the air in the interior be n vitiated.

We reserve, until our next number, the r mainder of this article.

Farm Architecture.

ASPHALTED PASTEBOARD—A NEW MATERIAL FOR ROOFIN

THE possession of a cheap and durable material for roof-covering, easily put on, is a matter of great importance, especially in rural districts where skilled labour is not easily obtained. For a long period asphalted felt has been extensively used; but the objection to this material is, that it softens, or is apt to soften by exposure, the material of which it is composed being so very porous. The peculiarity of the felt now under notice is, that the base is paper, which, in the place of softening under the influence of the weather, hardens, so that in the course of time it resembles slate in its hardness and impenetrability. We have now a portion before us, taken from a roof which has been erected for ten years, and it is more like a metal than a substance like what felt usually is. Another advantage the material possesses, is the resistance which it offers to the spread of fire. Although in itself a combustible material, still, when laid down on flat surfaces and properly finished, it possesses, in a remarkable degree, the capability to resist the spread of fire. The following report of a trial in this respect, will be interesting to our readers :—

In the year 1862, on the 15th November, trials were made in the Redan, near Copenhagen, with asphalt roofing pasteboard, manufactured by Messrs Erichsen & Co., superintended by Mr Howitz, manager of gasworks, and Mr Linde, fire-director.

The trials were attended by the chief of the police, the commander of the fire brigade, the chief of the Royal fire insurance department, as also by a great many other parties conversant with the matter, and took place in the following manner :—

1. Fire was made with straw and small and large shavings and chips of boards on a platform, made of joined 1-inch boards, covered with the said roofing pasteboard. The fire lasted about twenty minutes, and it proved that it did not extend to the pasteboard, and that this, where the fire was made, in no way gave nourishment to the fire, or opened in such a manner as to allow it to pe
trate to the substratum. It further appear
that nothing of the coating of the roof beca
fluid. When the fire had burnt out, it was fou
by examination, that the roofing pasteboard
carbonized and brittle, however, without chink
crevices, and the substructure only a little attack
by the fire.
2. Thereafter an experiment was made with a sm
shed of boards, which was set on fire at fo
three minutes past eleven o'clock. The shed
8 feet long, 5½ feet deep, and 6 feet high in
front. The shed had a slope of 3 inches on e
2 feet, and was covered outside with roof
pasteboard. The whole shed being filled w
straw, shavings, and similar combustible materi
was shut after being ignited, whereafter the
quickly spread.

After the expiration of about fifteen minutes,
fire broke out through the joints of the shed, exten
quickly and played on all sides around the roof, wi
out in any way attacking the covering of the same,
without the roofing pasteboard dissolving. It c
tinued burning for thirty-three minutes, during wh
time the shed collapsed. The fire-engine was th
after applied, in order to try the action of the w
on the pasteboard, being entirely heated. It pro
then, that where the pasteboard was not enti
turned into coal, it had not cracked, and neither
it crack by the action of the water, nor when it
entirely carbonized, but had the appearance of
brittle, coherent mass.

It proved further with reference to the joi
boards, forming the substructure of the pastebo
that these, being strongly attacked by the fire on
uncovered side, and although the fire had played h
on the covered side, were untouched by the fire, wh
they had been covered by the pasteboard, altho
nothing of the whole shed had been more expo
than the very substructure of the roof.

This result must be owing to the tightness of
pasteboard, coupled with its power to resist fire.

It should be remarked, in conclusion, that the pa
boards, after being laid on the substructure, w
merely once done over with asphalt-mastic, like
manufactured by Messrs Erichsen & Co.

This report has been drawn by the undersigned,
F. Linde and J. C. G. Howitz, both of Copenhag

(Signed) G. HOWITZ. C. F. LIND

The Royal General Insurance Company, and the Insurance Company, Denmark, as also the English and German Companies, represented at Copenhagen, where the pasteboard roofing is made, insure goods in buildings roofed with the asphalt-pasteboard, at [illegible]

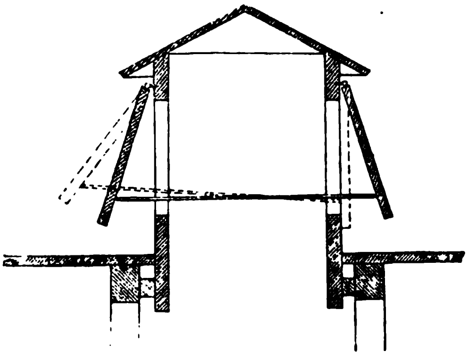


Fig. 1.

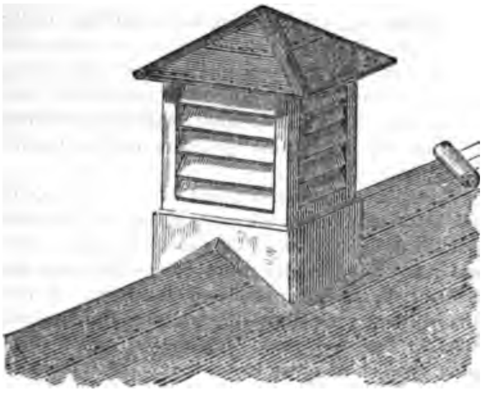


Fig. 2.

The result of this is, that roofing wi this material secures the cheapest insuran premium.

Roofs covered with asphalt-pasteboard r quire, after being treated according to the c rections given, no inspection or repair for long series of years; and the pasteboard beir a bad conductor of heat, the roofs are cor fortable during winter and cool in the summ time.

The following remarks and illustrations as t the use of this material will be useful here :-

The roof to be covered with asphalt-past board is to be provided with a covering dry boards ¾ inch to 1 inch thick, and n above 6 inches broad if possible; but if th boards are more than 6 inches broad, or not sufficiently dry, they ought to be spl once before being laid on, in order to kee them from warping, while every board shoul be fastened with three nails at least on eac of the rafters. This splitting prevents th drying of the substructure from exercising an injurious influence on the pasteboard roofin In case of boards ¾ inch thick being applie the rafters should not be more than 2 fe from each other.

As a roof of asphalt-pasteboard is entirel air-tight, which is not the case with roofs tiles, slates, or thatch, it is necessary, partic larly in barns, stables, and such building where the evaporations condense into drop and thereby, in a few years, exercise a injurious influence on the covering, to pr cure sufficient ventilation. This may best b obtained by applying on every 500 squar yards of the surface of the roof three ai tubes, at least 4 feet long and 2 feet dee (figs. 1 and 2).

If windows are applied in the roof, the should be constructed in the same manner those applied in slated roofs (fig. 3).

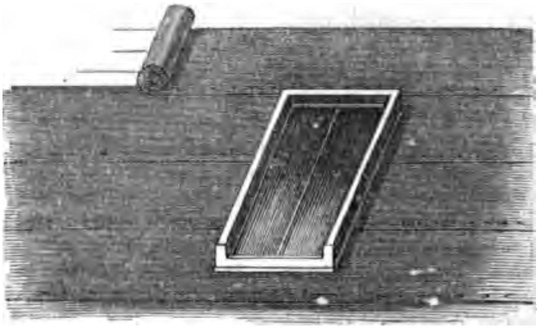


Fig. 3.

Roofing with rolls (fig. 4) may be done either from gable to gable, or from the eaves to the roof ridge.

The roofing of a double roof is, of course, to be commenced on both sides from the eaves.

After the asphalt is fastened on, the whole requires to be covered with asphalt-mastic.

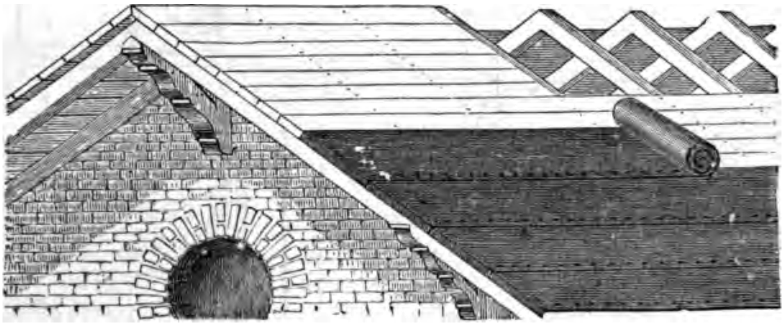


Fig. 4.

To keep the roof fully water-tight, the coating is to be repeated annually in the first two years, of course in dry weather, and every owner of such a roof may then, if this direction is attended to, rest assured that no new coating will be required in the first six or eight years. The fact is, that the roof obtains a crust of ⅛ to ½ inch, which defies all the influence of the weather.

When the roof has been covered with asphalt, it may, if desired, be spread with lime, chalk, or plaster of Paris, or any colour that may be chosen. A roof is especially to be recommende buildings, which are used for storing up g which cannot stand heat.

A roof of a large timber shed has rec been covered for the Cattle-Food and Ma Company at Dalry, near Edinburgh, this new material, and alongside of it an shed covered with the ordinary asphalte A comparison may thus be made bet the two, the results of which we shall in time, we trust, place before our readers. asphalted pasteboard is made by M Erichsen, Wilhjelm, & Co., of Copenh and their agent is Mr Swann, Leith Walk, E burgh.

CONCRETE BUILDINGS.

AS promised in an article given some months ago, we now take up the description and illustration of various models of building with concrete. The first we purpose noticing is Drake's Patent, now being very extensively used in all parts of the kingdom, and everywhere exemplifying, in a most satisfactory manner, the value of concrete as a building material.

The largest building yet attempted in concrete is being carried up with Drake's patent concrete builder, at Melrose, and a villa at Chertsey is the largest dwelling-house yet built in concrete.

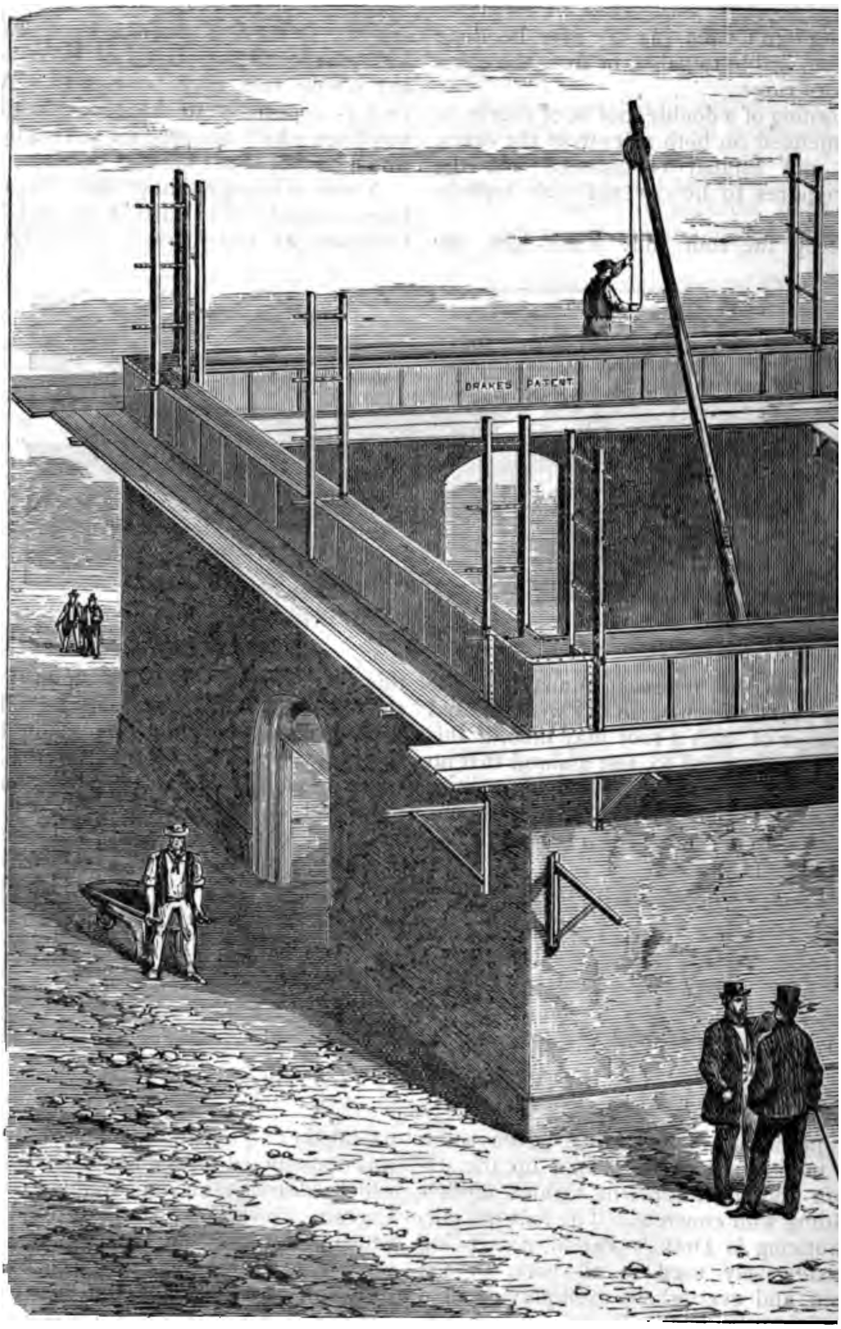
Previous to the introduction of Drake's patent, the only apparatus supplied to the p was constructed on the angular pillar sy which, although an improvement on the Captain Fowkes' apparatus (the mod which is in the South Kensington Muse was very far from being perfect, each appa being of use only for the exact kin building for which it was made, and ha numerous other imperfections.

Drake's patent appears to obviate al imperfections of the old apparatus an troduces several new and valuable featu

The special advantages claimed for Dr patent are:—

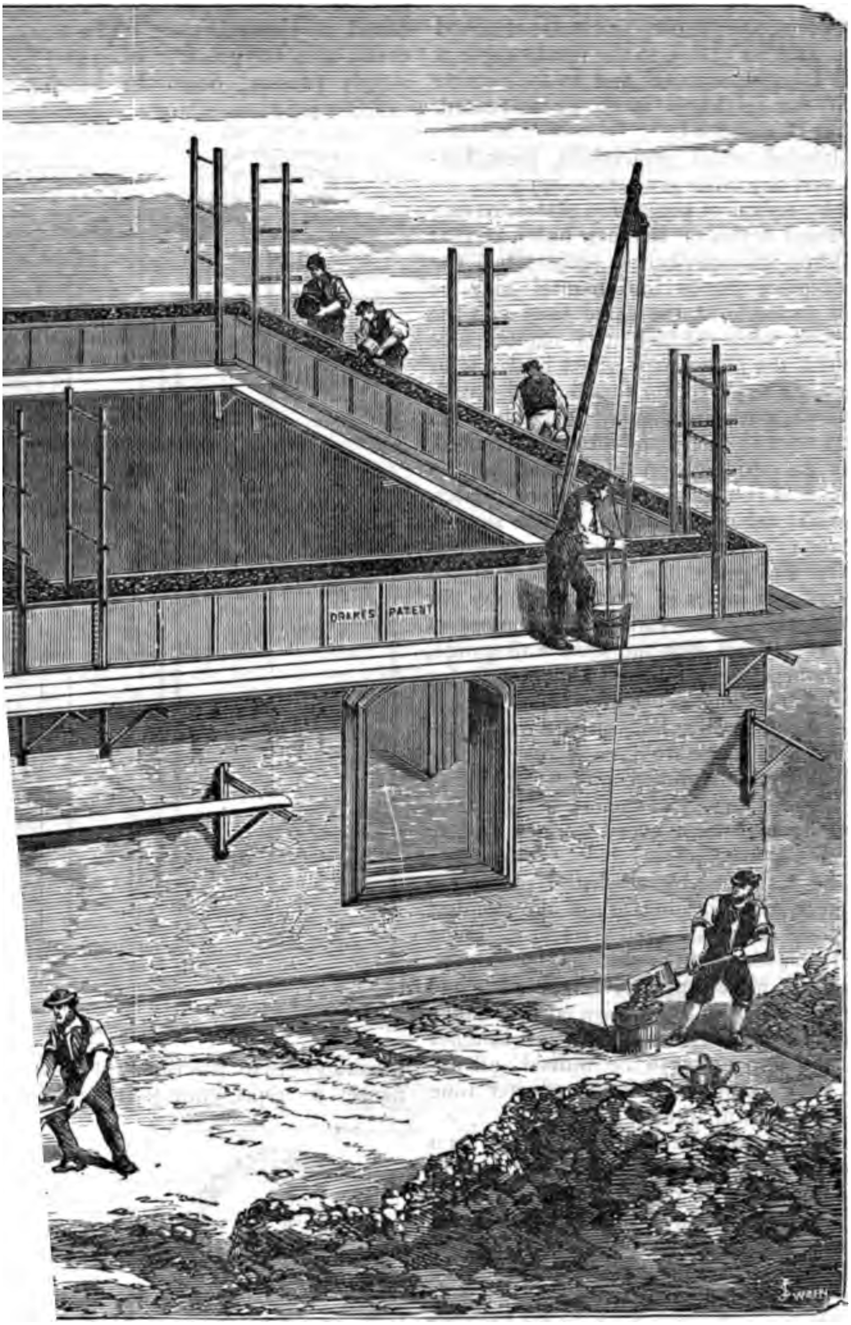
1. Being made entirely of metal, it i

VIEW SHEWING DR



[illegible] which [illegible]
[illegible] wood), which, bei
[illegible] ions of weather, t
[illegible] is not only tr
[illegible] so, from swelli
[illegible] prod [illegible] work.

The uprights being of channel
[illegible] the only provisions needed for
ing the plates, or panels, are holes
flanges of the uprights, these holes
made every 1 inch or 1½ inch, and th
[illegible] her be moved upwards any d



ch to 2 feet, as required, and being fixed at any point to allow in projecting string courses, or nd of projecting work.

l of forming the angles of build- ns of angular uprights, a pair of uprights are placed at each side of the angle, and at a short distance from the angle, and to these are attached inner and outer angle-plates. Being hinged, any kind of angle may be formed, either right, obtuse, or acute; and in case of altering the thickness of walls, adding pieces, or extending plates, are attached to these angular plates, to the inside angle if the wall is to be reduced, and to the outside angle if the thickness is to be increased. (See large illustration).

4. Chimney-breast projections, piers, buttresses, and any other projections on plan, are formed by means of projection plates, having a graduated series of fastener holes, so that in building chimney-breast projections, the chimney-piece jambs and mantel may be built in concrete at the same time with the walls; and when the height of mantel-piece is reached, the plates may be set back 1½ or 2 inches, as required, for the line of breast, and the chimney-breast may be reduced on the next floor if a less projection is required, or may be stopped off altogether, and a straight wall built with the same plates. Also, with these projection plates sloping buttresses may be built to any angle of slope.

5. The wall gauge is a simple piece of flat iron, having a series of graduated holes for pin fasteners, so that various thicknesses of walls may be built with the same wall gauge, and without any complicated attachments for increasing its length. These wall gauges leave a much smaller hole in the work than any other wall gauge we have seen.

6. Telescopic extending plates, capable of being attached to any of the ordinary plates, for lengthening them every ½ inch to any length, as required.

7. The fasteners, by which the plates are attached to the uprights, are of the simplest form possible, and easily worked, being tapered pins, which are passed through the end flanges of the plates, and through clips attached to flanges, into the holes pierced into flange of upright. This simple form of fastener allows the apparatus to be moved and adjusted for working in a much shorter time than any other apparatus.

8. The chimney flue core appears to be a very perfect arrangement for forming flues of any description. It obviates all the difficulties and objections of the old *tapered* core, which was not only difficult to draw, but also formed a series of ridges on the surface of the flue. Drake's flue core forms a perfectly parallel and even flue; and may be made either circular or oval, having an outer case of sheet iron in one piece, slightly overlapping at the joint, and a central bar with handle for drawing up. At top and bottom of central bar are a pair of toggled levers, which, when the handle is drawn, causes the joint to overlap, or the whole core to collapse or be reduced in circumference. The core is the drawn with the greatest ease, and is *reset* b simply pressing down the handle. Fig. illustrates two positions of the flue co figure 2 representing it open, figure closed. Figure 4 shews the plans these.

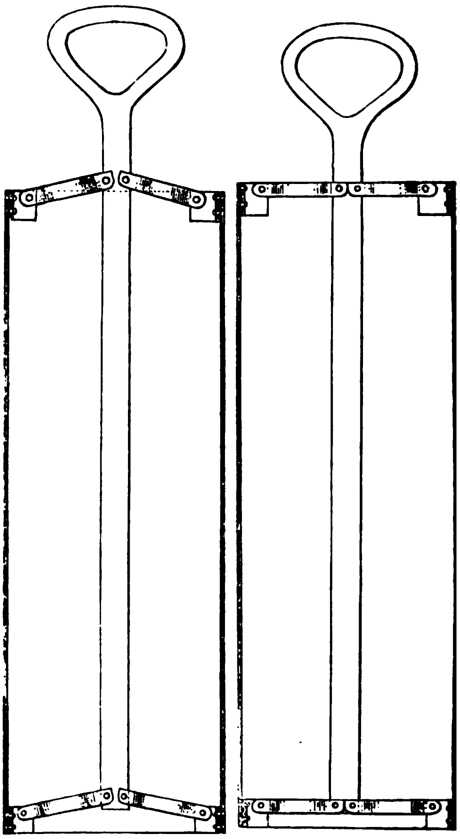


Fig. 2. Fig. 3.

Sections of Flue Core.

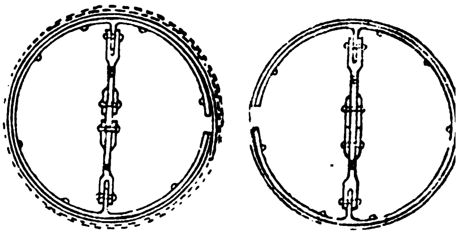


Fig 4.—Plan of Flue Core.

The following is extracted from Mes

Drake's pamphlet, and compares the angular pillar system with that of the patent we are now describing :—

The angular pillar system has numerous disadvantages. The angular upright has to be made to the exact angle required at first, and cannot at any time be made to build any other angle if required. Thus a square or right-angled angular pillar would be useless for building an octagon hexagon, or any other than a perfectly right-angled building.

All the frames to work with the angles have to be made of various lengths (the outer longer than the inner) ; thus, they will not work together for the building of a long straight wall.

All these frames have to be made of the length required to suit a given thickness of wall, and are useless for the building of any other thickness ; either the inner angle frames must be too long, or the outer frames too short (or *vice versa*), to allow of any variation in the thickness of the walls. Thus the angular pillar apparatus will be found expensive and impracticable in the Metropolitan area, where the walls decrease in thickness each storey (according to the schedules of the Act). New inner frames would be required for each angle at every decrease of thickness in the walls.

Two walls meeting at an angle must be of equal thickness ; thus the end wall of a house built with the angular uprights cannot be either thicker or thinner than the front or back walls (which is required to be done in some cases where the end walls carry flues), this is caused chiefly through the inner and outer angle pieces being fitted and bolted to cores passing diagonally through the walls at an angle of 45 deg., which can only be done where the walls are of equal thickness.

An angular pillar apparatus made to build (say a 15 feet frontage house with 9-inch walls) would not build the same sized house with say 12-inch walls (should such be desired in consequence of an additional storey). Neither could the frontage or other dimensions be decreased, without in both cases cutting and altering the frames at great expense, and also rendering them useless for the original sized building.

In building against a house already erected, and where it is often desirable to decrease the thickness, the angular pillar apparatus can only build the new end wall at an increased thickness of two or three inches.

It is sometimes desirable to build a fireplace and chimney in the corner of a room ; but with the angular pillar apparatus this cannot be built together with the walls, but has to be built up with boards afterwards.

The quoins or outer angles of a building should be of the strongest and best workmanship ; but with the angular pillar apparatus it is the weakest and most unsightly, having a large core hole left through the angle at every 18½ inches from the bottom to the top of the building.

At the chimney-breast, bay window, and other projections, double angles are used, which adds incre weight and clumsiness to the other disadvantag the angular pillar system.

Every one of these defects is avoided in Dra new patent machine.

Instead of the horizontal boards, or wood fra lined with zinc, or otherwise, as hitherto in sheet-iron or steel flanged plates are used. T are arranged and fitted to be worked either vertic or horizontally. In case of building boundary w where the packing does not require particular at tion, the plates may be used vertically, and the may be built to the whole height (say 4 feet, 5 or 6 feet) in one day.

Light flanged uprights, or connecting pieces, used on each side of the wall opposite each other, at a short distance from the angle ; thus the inner outer plates are of equal lengths, and universal reversible in working.

For building the angles, flanged plates are u which may be varied in length by means of extenc plates to suit any required variation in the thicknes the walls.

Also, by means of extending plates, the ordin plates may be lengthened, as required, from one i upwards.

Wood cores as wall guages are entirely disper with, thus avoiding large holes in all parts of work, and with Drake's angular plate system, also with his vertical frame system, there are no h whatever in the angles of the building. Anot great advantage gained by the use of angular pla instead of angular pillars with wood cores, is facility with which brick or stone quoins or dressi may be built up with the concrete walls, or a moul or chamfred quoin be formed in concrete. The guage for holding the two sides of the mould at required distance is a graduated stay, capable being adjusted to build various thicknesses of w whereas the wood core system requires a separate of cores and bolts for each different thickness of wa

In the building of chimney-breast or other pro tions, instead of double angles (requiring a sepa double angle for every variation in the depth of jection), projection plates are used, which are fit for building various sized projections.

The scaffold is carried up by the upright, thus strain of the scaffold is borne by the whole depth wall to which the upright is fastened, instead of, a the old system, being thrown on the few inches wall to which the bracket is bolted.

Also, the use of light flanged plates, instead awkward wood frames, allows of the mould be deeper, and therefore capable of producing an increa quantity of work daily.

And not having to be made specially for each bui ing, as ordered (which has been the case with concr apparatus hitherto), complete apparatus can be kep stock ready for immediate use. And one of the m important advantages is, that angular pillars, or rights (one of the principal parts of apparatus hithe in use), are entirely dispensed with.

Farm Engineering.

*BOILERS AND BOILER EXPLOSIONS.**

THERE is a difference of opinion among the supporters of electricity as to the precise manner in which it acts. One class assign the cause of explosions to some electrical development decomposing the water and exploding the gases; while another class affirm that a sudden change of density in the steam evolves electricity of two different kinds, positive and negative, and these uniting explode. This is all hypotheses, however, for there never existed the slightest evidence to prove that free electricity ever exists in steam whilst it is contained within an iron boiler; although, unquestionably, electricity is generated in the process of condensation, or by friction when steam is discharged under pressure, through contracted orifices into the atmosphere; and in all cases where electricity has been observed about boilers, it has been when steam was thus issuing out of some aperture. Professor Faraday who made a series of experiments on this subject, came to the conclusion, that electricity is never evolved by mere evaporation, nor by the friction of pure steam, but only when water is present. When the safety valve was opened wide and the steam escaped without friction, he found no signs of electricity displayed but when allowed to impinge against a co[illegible] electrical effects [illegible] manifested [illegible] if elec[illegible] [illegible] frequently [illegible] though there was not sufficient to burst the boiler, sti there would be some manifestation of it presence, as by powerful discharges, lou reports, and all other usual electrical phenomena. Considering the superficial characte of electricity, and that the fragile materials of electrical apparatus are not broken under th most powerful discharges, why should a boile be torn and twisted like leather by the sam cause?

If there were explosive gases generated i a boiler—such as oxygen and hydrogen—i the proportions which compose water, and i an electric spark were sent through them they would explode, and shatter the boiler t pieces; but by no other method of operatio that science has revealed can electricity caus an explosion in a boiler. To demonstrat the correctness of this theory, therefore, it advocates have not only to prove that electrical discharges take place in boilers, bu that hydrogen and oxygen gases, in a fre state, are also present. From all these arguments we may conclude that whatever is the cause of explosions, it cannot be electricity. Natural as it is, on witnessing the astounding effects produced by the uncontrolled powe of steam, to ascribe them to occult, imaginary, and other far-fetched, although so-called scientific causes, it is very blamable, [illegible] parties who ought to know better, encourage such belief, because it indisposes men who have the care of boilers from giving sufficient attention to simple palpable facts and [illegible]ances in practice; a check is placed [illegible] examination, and thus the true [illegible] the evil are kept out of view, and [illegible] in other cases.

[illegible] excess of steam pressure in proportion to the strength of the boiler is generally supposed sufficient to account for explosions, but we think this theory is incomplete. Simpl steam pressure is exactly like water or air pressure, it may be gradually increased until it becomes greater than the resisting powers of the vessel, when a rupture will take place and the pressure be relieved; this will be comparatively harmless. How is it, then, that the same cause which produces simple rupture in some cases, can occasion violent and disastrous explosions in other cases? The influence which the presence of water within the boiler has upon the character of an explosion, is quite disregarded by most people, and if we consider this, we think we may discover a solution for this paradox. Water in a boiler, under a heavy pressure, is of a considerably high temperature, and minutely mixed up with steam; in fact, it might with propriety be called liquid steam. At 336 lb. pressure, the water has a temperature of 428 deg. F.; and should the boiler give way above the water level, at this pressure, more than simple rupture would ensue. The steam in the steam-chamber would be instantly liberated, and, the steam pressure being thus relieved, a considerable quantity of the heated water would flash off into steam, which, following up the rupture, would by its percussive force completely rend the boiler, and project its parts with great violence. This need not excite surprise, for, considering the great heat of the water, and the impossibility of retaining it as water at a greater temperature than 212 deg., we may form an idea of what a large amount of steam would be thus suddenly generated; and as the strength of iron to resist a gradual and a sudden pressure do not coincide, we may reasonably conclude, that this steam, rising with great velocity, acts precisely in the same manner as the elastic gases generated in the firing of gunpowder do, when in a piece of ordnance where the ball has not been rammed home. That steam does act in this percussive manner has been clearly proved in practice. In Cornish engines, the impact or percussion of high pressure steam suddenly admitted on the large pistons has been found to spring the cylinder covers. These were formerly stiffened by stout ribs dividing their upper sides into segmental cells, but as the cover was thereby deprived of all elasticity, it broke under the shock just mentioned; the form and arrangement of these ribs have been changed in consequence.

We consider this theory the most probable of any yet advanced to account for the precise mode by which explosions are produced. It is simple, tangible, without mystery, a quite according to all the laws of physics.

We have seen that an excessive pressu of steam in proportion to the strength of t boiler is the immediate cause of all expl sions; this, however, may be acquired many ways. 1st, The boiler may have be originally weak; 2d, Weakness may ha been produced from gradual corrosion of t material of which the boiler is made; 3 The safety valves may have been accidental or wilfully overloaded; 4th, A sudden pr sure of steam may have been produced l overheating the plates, and then allowi water to come in contact with them; or l defective circulation. It may be interesti to notice each of these heads more fully:- 1st, Original weakness or defective constru tion. This is undoubtedly one of the chi causes of these accidents, and until our boil makers pay more attention to the laws strength of materials and form, we can scarce expect any improvement in this quart Most of the cases of explosion in Corni boilers arise from weakness of the flue. T flues are often oval in section, and this form adopted, no doubt, for the purpose of obtai ing greater depth of water over the flue wit out diminishing the heating surface, or t amount of steam room, but in thus endeavo ing to avoid the chance of accident fro deficiency of water, we run into the contra extreme, and the boiler collapses from t weak form of the flue. 2d, Gradual corrosi —this is a frequent cause of explosion, b chiefly confined to the old class of boile the plates in some instances become wast away in thickness to a most incredible degr In a boiler which exploded at the grain mi in Glasgow, some parts of the plates we only 1-16th of an inch thick over extensi breadth. In another instance, at Tipton, plate for a space 6 inches in width, was this means reduced to only 1-64th of an in thick. Frequent and careful inspection the boiler, and especially those parts expos to the direct action of the fire would grea lessen the amount of accidents from this cau 3d, The obstruction of the safety valv How often do we find, when we investig into the primary cause of an explosion, th it solely arose from the ignorance and to insensibility to danger of the attendants, wh to obtain an extra pressure of steam, ha not hesitated to fasten down the safety valv An instance of this kind lately occurred he where the engine tender, in order to get a go supply of steam to start with after breakfast, attached an iron rake to the end of the valve lever; the consequence of which was a gradual increase of pressure until it arrived at the greatest resisting point of the boiler, when it burst, killing two men, and severely injuring others. This boiler had been condemned a long time before, but the proprietor, in the hardihood of fancied security, continued to use it, and add patch upon patch, until some parts had lost all resemblance to the original shape, and from being round had actually become polygonal. 4th, A sudden pressure of steam, from the plates being red-hot, or from defective circulation. When the plates become red-hot, if water is suddenly introduced it does not form steam at once, but assumes the spheroidal shape, and merely rolls about without giving off steam, for the temperature of these spheres never exceeds 205 deg. Fahrenheit, yet should the plates become cooled down to the maximum evaporation point, an immense quantity of steam, too much for the safety valves to let off, will be suddenly generated, and rend the boiler. Cases are known where water has been pumped into a boiler when the plates were red-hot, without any accident ensuing; but this was done with the utmost caution, and by men who were conscious of the circumstance and danger. Defective circulation, however, is a more common cause of a sudden increase of pressure than deficiency of water. Circulation in a boiler is only maintained by particles of steam and hot water ascending from the heated surface, and being replaced by colder and heavier particles. Now, in narrow water spaces, and where there is no current produced by feed water or motion, and with an intense pressure above, the water becomes stagnant, or in a state of equilibrium, the particles of steam not escaping from the plates form a film of steam between them and the water, the plates continue to heat, and the steam above the water becomes superheated, until some sudden motion disturbs the equilibrium, such as the starting of the engine or opening of the safety valve, causing motion of the steam; when the confined steam rushes up, cold water supplies its place, and the finely divided water which is raised along with the steam, is converted into steam by that which is already superheated. All these combined produce a sudden pressure which the boiler is quite unable to support, and explosion ensues as a consequence. This is a very common cause of locomotive explosions, the greater number of which happen when the engine has newly started, after having been standing for some time. A very clear instance of this kind occurred at Burnmouth, near Berwick, where a locomotive had been waiting for some time in a siding, to allow a passenger train to pass and when the engine did get started, it had not proceeded far, when, from the disengagement of this pent up steam, a sudden pressure was produced, which shattered the firebox, made the engine turn a somersault, and killed both driver and fireman.

A great deal might be done to lessen th number of explosions, by frequently and carefully inspecting the boilers, using all the approved contrivances for estimating and relieving pressure, and employing only intell gent and cautious men as attendants.

Our Pasture Grasses.

LOLIUM PERENNE (Linnæus) COMMON RYEGRASS.

SYNONYMS.—*Phœnix* of Dioscorides, and termed by succeeding antient authors *Phœnix simplici* and *Loliu seminis colore Phœnices.* Caspir Bauhine, in his "Phytopinax, or Index of Plants," published in 159 named it *Gramen loliaceum angustiore folio et spica.* His contemporary, J. Gerarde, in his "Histo of Plants," called it *Lolium rubrum ;* and John Hill, in his "History of Plants," 1751, denominated *Lolium spicis muticus radice perenne*—the naked spiked awnless Darnel, with a perennial root. Althou ryegrass is now the generally accepted mode of spelling the English name, both botanical and agric tural authors have indiscriminately written it raegrass, raygrass, rayegrass, reygrass, riegrass, and ryegra The origin of the English name ryegrass, has been the subject of considerable speculation and differe of opinion among agricultural authors. By those of the last century it was most frequently written ra grass ; hence some argued that it might have been so called in compliment to the celebrated natural J. Ray, of Essex, who published his "Methodus Plantarum" in 1682, and his "General History Plants" in 1686 and 1688, and who, they conjectured, may have been the first to recommend its cul vation. In Thomas Hale's "Complete Body of Husbandry," 1756, it is stated that the proper name this kind of darnel is raygrass, which some write ryegrass, riegrass, reygrass, raegrass, and rayeg according to their notions of spelling the cereal rye :—"Now, ryegrass is an English name of anoth grass, one of the worst and most unserviceable of all the kinds ; it grows by waysides, and has a beard ear resembling that of barley." This is unquestionably the Hordeum murinum of Linnæus, which is ve correctly figured and described by Gerarde, 1596, under the name of "Hordeum spureum, wall or w barley, and by old English writers called way-bennet ; but as it more resembles rie, it cannot be fit named than by calling it wild rie or riegrass." The same author gives raye as one of the names of "t white darnel (Lolium album), which, among hurtful weeds, is the first." Parkinson, 1640, named the lat rye or darnel, and published, in his "Theatre of Plants," three figures of ryegrass of three sorts—Gram secalinum maximum, majus, and minus ; the first of which is undoubtedly the sand-reed, or sand-be Arundo arenaria of Linnæus ; the second is the above-mentioned wall barley, Hordeum murinu and the third is that pest of some English meadows and meadow hay, the perennial barley (grass), pratense. Ivraie, the French name for the genus Lolium, has also been suggested as affording a lik derivation for our ryegrass ; which has certainly no resemblance or affinity to the corn rye suffici to warrant any appropriation of its name, so that the origin of the name ryegrass may safely attributed to the fore-mentioned raye or rye ocasionally applied to its co-species, that poisonous and p nicious field weed, the white or bearded darnel (L. temulentum), long before the culture of L. peren was commenced ; and the transference of which to the latter by its first cultivators, to distinguish it fr the former, which was then one of the most troublesome pests husbandmen had to contend with, v both easy and natural.

DESCRIPTION.

ALTHOUGH named by Linnæus, Lolium* perenne, the common ryegrass has no claim to permanency in its duration; five or six years being, with rare exceptions, the utmost length of time that plants can be preserved, even by the most careful management; while, under ordinary treatment, their duration is more f quently limited to about half of that perio Nevertheless, the name seems to have be considered sufficiently appropriate by author, to distinguish it from the other spec known in his day, all of which were as stric annuals as either wheat, oats, or barley; rip ing their seeds like these the first summer, a then utterly perishing without leaving a remnant of greenness or vitality. Its roots strictly fibrous, without any under-grou spreading shoot-producing ones. Shoots short, more or less crowded together at their base, branched in vigorous plants, but not rooting at their joints, and as well as their foliage, more or less decumbent when young, or spreading outwards; leaves of the barren or root shoots and stem similar, being all flattish, narrowish, flaccid, and tapering gradually to their points. Stems usually from 20 to 30 inches in height, upright, cylindrical, minutely striated, smooth, and with four or five joints, which, together with the sheaths of the leaves, are almost invariably reddish or purplish coloured—hence the old names of Lolium rubrum, and red Darnel. This peculiar colouring of the leaf sheaths on the root shoots, is also very serviceable for distinguishing ryegrass plants in winter from those of other flattish leaved kinds, such as the meadow grasses, flat-leaved fescues, &c. Inflorescence in flattened spikes; spikelets alternate, having their edge presented to the rachis or centre stem, and each with a single oblong-lanceolate fine ribbed calyx or glume arising from the outer base, which is longer than any of the seeds or florets, but shorter than the entire spikelet. Florets, and consequently the ripened seeds, awnless. Flowers most profusely from the middle to the end of June, and ripens its seeds in from a fortnight to three weeks thereafter.

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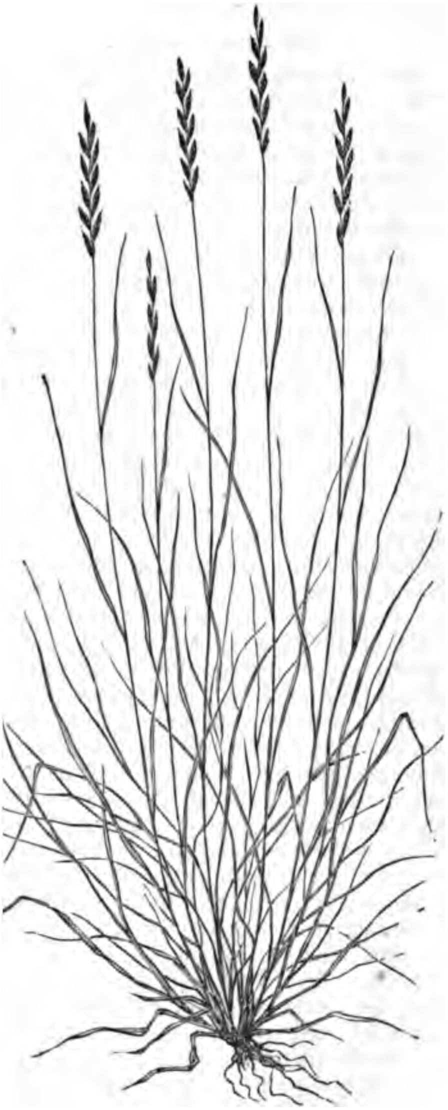
* From *Lolium*, a name applied by the Latins to the poisonous darnel, *L. temulentum ;* and *perenne*, from its being the most perennial species—all the others known to Linnæus having been strictly annuals.

NATURAL DISTRIBUTION.

John Naesmith, of Hamilton, in his "Thoughts on Various Objects of Industry in Scotland," published in 1790, promulgated an opinion, in which he was followed by a few superficial observing contemporaries and successors, that the cultivated ryegrass was not identical with the Lolium rubrum of Gerarde, and that it was of foreign origin, "never being found in wild uncultivated places unless where the seed had b[illegible] casually carried." Judging [illegible] on and woodcu[illegible] [illegible] author, as w[illegible] [illegible] authorities [illegible] well a[illegible] [illegible] d North-Wester[illegible] [illegible] some [illegible] included its name [illegible] Flora of North America; but D[illegible] [illegible] recognized as the highes American botanical authority of the pr sent day, is of opinion, that, although i is now naturalized in the United State it is not strictly indigenous to any part c North America, but that it was originally in troduced from Europe. It has not bee found wild in any part of the southern hemi sphere, but is becoming abundantly naturalize throughout Australia, New Zealand, and i the South African British possessions.

CULTURAL HISTORY.

It is almost impossible to conceive tha antient owners of flocks and herds could hav wholly ignored the improvement of, at leas portions of those meadow and pasture land on which they must have mainly depende for the sustenance of their cattle and shee But although it is probable that the watering o irrigating of these in periods of extrem drought, and the top-dressing of them wit the excrementitious contents of "the folds, may have been occasionally practised fro very early times, it is almost certain tha none of the natural herbage and forage grasse were sown and grown for the exclusive feed ing of live stock till about the middle of th seventeenth century, when ryegrass was firs cultivated in England. Although we hav no authentic record as to where, or by whom it was first thus introduced, there is sufficien proof of that having taken place about th time here stated. For neither Johnson, in hi edition of "Gerarde's Herball," 1633, nor Park inson in his "Treatise of Plants," 1640, mak any mention of its having then been cultivated although it is figured in both of these cele brated folios; and it is described in the firs as an "unprofitable corne or grasse," whil in the last "its place" of growth is stated t be "in the fields of corne, or in the border and pathways of other fields that are fallow.' In "Waldridge's Husbandry," 1677, ryegras mentioned as having been cultivated for som [illegible]ously; and Dr Plot wrote, also, i [illegible] they have lately sown ray-gras [illegible]liaceum—to improve cold, sour [illegible] weeping ground, unfit for saint-foin [illegible]s supposed to have been first don in the C[illegible]tern parts of Oxfordshire, and nex Islip, in the same county, by one Eustace.' The cultivation of ryegrass did not, however become general in England till towards th middle of the last century, after which it retrograded considerably, as is evident from the writings of different authors, of whom may be mentioned the eminent Arthu Young, who, in his "Annals of Agriculture,' lished in 1784, gave an account of a night's tour in Kent, in which he alludes there prevalent opinion, which led to a rease of its cultivation, that "if land lays or three years under ryegrass it exhausts becomes worse to a considerable degree."



olium perenne, reduced, shewing habit of growth.

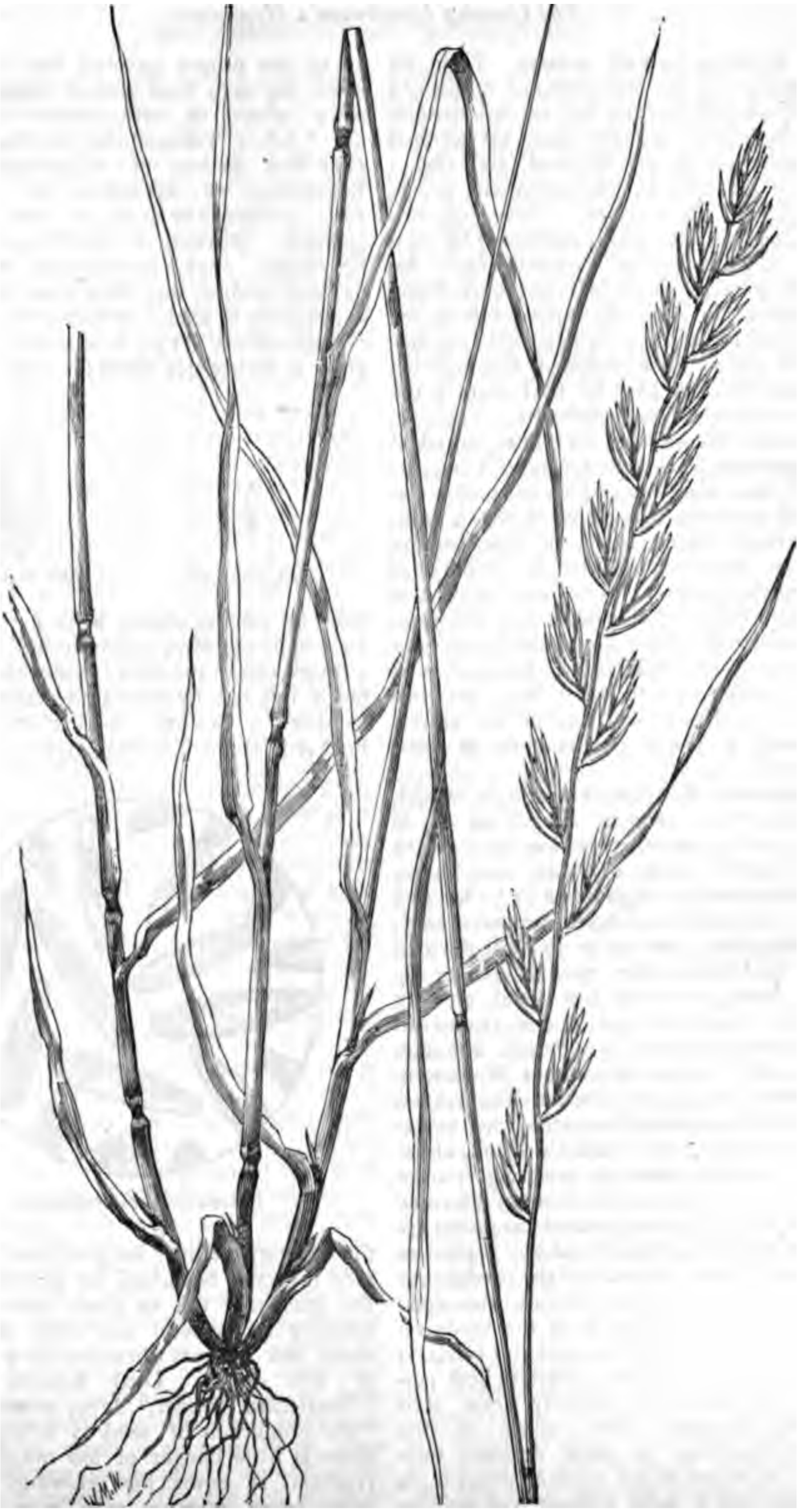
d in a "Minute of the Husbandry con-ted at Holkham, by Thomas William ke, Esq.," ancestor to the present Earl of icester, he states that that enterprising iculturist had found ryegrass unsuited for the dry thin soils of Norfolk, where, by midsummer, it too often became burnt up, and of very little value. And in the same Minute, its author further states, that "however useful, and even necessary in some cases, ray-grass may be, never let it be forgotten, that it is an exhausting plant, and one of the worst preparatives that can be for corn."

In Scotland the cultivation of ryegrass seems to have been unknown till about the second quarter of the last century. In the "Select Transactions of the Honourable the Society of Improvers in the Knowledge of Agriculture in Scotland," published in 1743, the sowing of ryegrass is frequently recommended to such of the nobility and gentry as applied for the Society's advice in the improvement of their estates. And Mr Robert Maxwell, the most celebrated "land doctor" of his time, who prepared these "Transactions" for publication, strongly advocated the cultivation of ryegrass, in various reports upon the improvement of landed estates, on which he had been professionally employed. Thus, in his "Survey of the Estate of Ettrickhall," 1757, he recommends dividing a field of about 10 acres "of haugh ground, at Wester Ettrick, into halves, which might be in corn and ryegrass alternately, and would afford a sufficient quantity of hay that would be physic as well as food for sheep, by drying up watery humours which cause the rot, and their death." In a "Treatise of Agriculture," by Adam Dickson, A.M., minister of Dunse, 1770, ryegrass is stated to "be the most common of all the artificial grasses cultivated in Scotland, and notwithstanding what some have said against it, it is not the least valuable." Until about this time Scotch cultivators depended almost entirely upon English seed growers for the best and cleanest supplies of ryegrass seed; but in the "Gardener's Pocket Dictionary," published by James Gordon, nurseryman at Fountainbridge, near Edinburgh, in 1774, it is stated that, "of late years, since a spirit of improvement has prevailed, many crops of ryegrass seed had been saved in Scotland, which the English merchants have declared to be as good as any of the produce of their own country." Dr J. Anderson, of Monkshill, Aberdeenshire, who in his "Essays relative to Agriculture and Rural Affairs," 1784, advocates the superior merits of other grasses, states that "ryegrass has been long cultivated in our fields; and it is now in general very well known to be but a very indifferent grass for pasture, on account of the tendency it has to send out numerous seed stalks very early in the season after which no animal will take it; so that, unless it be for a very short while in the spring, when the leaves are tender and succulent, it is no longer fit for pasturage; the stalks, after the month of May, becoming withered, so that after that period the field is usually covered entirely with these dead stalks, and remains during the remainder of the season with very few signs of vegetation of any sort. It is, moreover, but a short-lived grass. On both which accounts it is by no means to be recommended, in general, as a proper grass for pasturage." James Adams, in his "Practical Essays on Agriculture," 1789, stated that ryegrass was then more cultivated in Scotland and in the north of England than in the central and southern English counties. J. Donaldson, of Dundee, in his "Modern Agriculture," 1795, records ryegrass to have been then "very generally introduced into Scotland, as also in many of the English counties, and that large quantities of its seed were saved both in England and Scotland." Further, under the heading, *artificial pastures*, he states that "ryegrass is always sown, whether hay or pasture be the object, and although some writers describe it as a very bad grass, yet the practical farmer appears satisfied that the contrary is the case; or, at least, there are no other of that tribe of grasses which he can cultivate to so much advantage, especially if the pastures be kept fully stocked in the early part of the season."

To the above quoted deprecatory remarks relative to the Lolium perenne, must be added those of Stillingfleet, who, about 1759, first directed the attention of reading agriculturists to the superiority of other native grasses; and those of Curtis, who shortly afterwards first cultivated seeds of six of these for sale in his botanic garden at Lambeth-Marsh, as well as of numerous succeeding writers, the correctness of which remarks were fully confirmed by experiments conducted in John Duke of Bedford's famous grass garden, the results of which were laid before the public in Sinclair's "Hortus Gramineus Woburnensis," published in 1824. Notwithstanding all that has been said against the cultivation of ryegrass, the strictures have hitherto had little or no effect in diminishing its cultivation. Doubtless, many other kinds are now sown for forming superior permanent pastures, and other purposes; and since the introduction of Italian ryegrass, in 1831, that more excellent and valuable species has been largely substituted for it; still, the quantity of common ryegrass seed which is annually reared, sold, and sown has suffered no diminution, a result which can only be accounted for from its possessing counteracting merits that must be set agains its demerits, which are pretty fully set forth in Dr Anderson's previously quoted remarks The following are the most evident of these counteracting merits, viz. :—

QUALITIES AND USES.

First, The robust braird and rapid growth of its young plants, by which they are speedily placed beyond danger of injury from weather slugs, and insects. *Second*, Its natural adaptation to all kinds and qualities of cultivated soils. *Third*, Its attaining to full growth or maturity in the second year of its existence while many of the others require three or even four years for their full development. *Fourth* Its hardiness, early growth in spring, and long retention of autumn verdure. *Fifth* Its abundant production of seeds, and the comparative ease or facility with which these can be harvested and prepared for market resulting in their being much cheaper and more easily got than those of other sorts. And *Sixth*, Its comparatively short-lived or subperennial, strictly fibrous-rooted habit of growth, by which its entire destruction is easily accomplished, in ploughing or preparing the ground for the next succeeding crop. Hence its suitability both for hay and pasture purposes, in alternate husbandry, as well as for forming a principal portion of all mixtures intended for permanent grass, as its early maturing plants occupy the ground, to the exclusion of weeds, before most of the more permanent grasses have grown up; while being comparatively short-lived, they make way for these others as they attain to their full growth By the Woburn experiments, what was termed the improved Pacey's ryegrass, grown on a rich brown loam, produced on the 16th of April at the rate of 4083 lb. per acre, while that at the time of flowering amounted to 7827 lb. which lost in drying 4438 lb., so that 3389 remained as the weight of hay; while at the period of seed ripening the weight of grass had increased to 14,973 lb., and the hay to 4492 lb. per acre. Another variety, named Russel's ryegrass, which was grown under similar circumstances, proved very superior to the last, inasmuch as its yield at the 16th of April was equivalent to 5445 lb., at flowering to 15,654 lb. of grass per acre. But for total weight of crop, even the last was much inferior to the cocksfoot, timothy, foxtail tall, and several other fescues, as well as some



Lolium perenne—Natural Size.

other common pasture grasses. From an early period in the cultivation of ryegrass, a belief prevailed that the hay became deteriorated by leaving the crop uncut till the seed became even nearly matured, and that a material decrease in the aftermath occurs through the same cause. These opinions have since been more fully confirmed by both field and analytical experiments; the only disputants to their correctness being stablemen, who derived perquisites from the sale of hay-loft seeds, a reprehensible practice not yet altogether abandoned, although exposed so early as 1806 by Dr Coventry, the first Professor of Agriculture at Edinburgh, who, in his "Treatise on Live Stock," remarked that "grooms, having the refuse seed as a perquisite, are sometimes led to prefer the ripened produce, from motives which overmatch their virtue; a ton of ripe ryegrass hay has frequently yielded a quantity of seed worth 30 per cent. of its own price." And a contemporary of the Professor, Mr John Shirreff, of East Lothian, remarked that "not only grooms, but stablers who take horses at livery, prefer ripened wiry hay, for two reasons: 1. Horses eat less of it; and 2. the seed it yields puts money in their pockets."

Ryegrass seed is very variable in weight, that of "light annual seed," as it is termed, being frequently as low as 16 to 18 lb. per bushel, while first-class samples are not unfrequently as high as 28 to 30 lb., and in one Continental sample we have seen, weighing 36 lb.; but 24 to 26 lb. is deemed to be seed of excellent quality, and 23 lb. is, by many, considered a good growing weight. These average about 15,000 in 1 ounce, or 5,480,000 in a bushel, although Sinclair, in "Hortus Gramineus Woburnensis," gives 6,163,740 as the latter. The greatest number of ryegrass seeds vegetate when covered with from a ¼ to ½ an inch of soil; about half the quantity when the covering is from 1½ inch to 1¾ inch; and although a few come up from under 2½ to 3 inches, no plants appear when the seeds are buried by 3½ inches of mould. Being thus one of the strongest or most vigorous brairding grasses, the same careful, shallow covering-in of the seeds, recommended for those of most other kinds, is not needed; and that is generally best performed by means of ordinary grass seed harrows, although mere rolling of the soil, after sowing, is often deemed sufficient. In regard to no other seed has there been, and still is, more difference of opinion
as to the proper quantity that should b
sown per acre than that of ryegrass, whe
sown alone, or with clovers only. I
the "Select Transactions of the Honou
able the Society of Improvers in th
Knowledge of Agriculture in Scotland,
1743, 4 bushels of seed per acre is reco
mended. Maxwell, in his "Practical Hu
bandman," 1757, recommends the sam
quantity, adding, that there is no loss in gi
ing liberally of seed. In Dickson's "Treatis
of Agriculture," 1770, it is stated that "ry
grass is sometimes sown for hay and som

Seed, natural size.

Seed magnified.

times for pasture alone; when for hay, the
are commonly sown upon the acre from 2 t
4 firlots wheat measure; when the land i
much infested by weeds the more seed i
required." Gordon, in his "Gardener
Pocket Dictionary," 1774, gives 3 firlots a

Different views of seed magnified.

the ordinary quantity for good ground, if th
seed is clean; but where the land is poor, c
the grass-seed not so good, then a larg
quantity is needed; and adds, that som
allow less ryegrass when they give it 10 l
of red clover. Lord Kames, in th
"Gentleman Farmer," 1779, mentions th
"the proportion of seed is arbitrary, a
there is little danger of too much. Wh
ryegrass is sown for growing seed,
firlots wheat measure may be sown on

It must, however, be kept in mind
t is the Scotch acre to which all the
ding authors refer. In Hale's "Com-
Book of Husbandry," 1756, 3 bushels
grass seed is stated to be "a proper
ity for an English acre, in mixture with
s, or more may be added." And in
Bath Letters and Papers," 1788, the
ctions given are, "If your grass seeds
ean (which should always be the case) 3
ls will be sufficient per acre. This is
the smallest quantity recommended by
s of the last century, and seeing that it
nts to somewhere about 375 seeds to
uare foot, it need be no matter of sur-
that the present practice is to sow much
er. Although agriculturists are still far
being unanimous in regard to the proper
ities, for we find in "Lawson's Agricul-
Manual," 1836, and subsequent treatise on
ltivation of grasses by the same author,
18 lb. or little more than three-quarters
shel is the largest quantity recommended
ternate husbandry mixtures, and 10 to 12
those intended for permanent pasture.
for sowing alone for producing seed,
50 lb., or about 2 bushels, is the quan-
ecommended for an imperial acre in
on's "Cyclopædia of Agriculture," 1855.
discussion "on the best mixtures of grass
for sowing," which was held by the
Lothian Agricultural Club in April 1861,
were produced communications from
nt farmers in different parts of Scotland,
shewed that from 2 to 6 pecks per
of the seeds of ryegrasses in mixture
fully as varied proportions of clovers
sown for grazing purposes, and from 2
bushels when intended for hay. In
ractice of the members present a nearly
diversity was stated to exist; hence no
ite resolutions could be formed from
conflicting evidence. And "it was
imously resolved that this Club is of
on, that different soils and localities re-
different mixtures of grass seeds; and
ience only can teach the farmers what is
est mixture, according to circumstances."
olution this, which is more characteristic
ution than of confidence, and one which
s the question as far from solution as
And a series of properly conducted
iments is still much wanted to shew
approximate quantities of grass and
r seeds most suitable for being sown
r different circumstances, as well as for
ent purposes. And the first essential
in conducting such experiments would be that of testing the proportions of fresh or growing seeds in these experimented with.

Foulness, or the admixture of weed-seeds in those of ryegrass, is an evil that cultivators have always had to contend with, although these are now less generally prevalent than in former times, when many agriculturists contented themselves with the cheap sweepings of hay lofts, in place of carefully grown and selected stocks of ryegrass seed. An excellent article lately appeared on this subject in *The Farmer*, vol. xii., p. 628.

CHEMICAL ANALYSES.

Professor Wray's analyses of L. perenne, collected when in flower from meadows in the neighbourhood of Cirencester, shewed that *in a fresh state* it consisted of 71.43 parts of water, 3.37 of albuminous or flesh forming principle, 0.91 of fatty matter, 12.08 of respiratory principles—starch, gum, and sugar—10.06 of woody fibre, and 2.15 of mineral matter or ash. In a dry state, 11.85 of albuminous or flesh forming principle, 3.17 of fatty matter, 42.24 of respiratory principles—starch, gum, and sugar—35.20 of woody fibre, and 7.54 of mineral matter or ash. According to the Woburn experiments, Pacey's ryegrass, grown upon a rich brown loam, yielded at the time of flowering at the rate of about only 305 lb. of nutritious matter per acre; while that from Russel's ryegrass was 733 lb., or more than double the other. But even this large proportionate amount was considerably more than doubled by the common Timothy grass, and far surpassed by most of the other pasture grasses which are now occasionally cultivated. The first was also largely surpassed by the soft brome grass, and the second by the smooth brome grass—those pests of our hayfields, which are more familiarly known as goose grasses. A startling result, certainly, could those experiments be depended upon; but, although conducted after the formula laid down by no less an authority than Sir Humphrey Davy, in his "Agricultural Chemistry," they are now deemed unworthy of much dependence.

VARIETIES.

The diversity of appearance presented by the varieties and sub-varieties of L. perenne, is apparent to even very superficial observers, and much beyond what is to be seen in any of our other native grasses. This is, doubtless, in a great measure owing to, or consequent upon, the much more lengthened period during which it has been grown, as well as to the vastly greater extent of its cultivation. In 1823, Mr Whitworth, of Acre House, had collected and cultivated the surprising number of sixty varieties; and the following enumeration of recognized kinds will suffice to shew the great diversity which exists in the characteristics, and qualities of the varieties of L. perenne; as well as the attention which has been bestowed upon them both by cultivators and agricultural writers.

1. The ordinary, or typical form of the cultivated L. perenne, described at page 176, and figured at page 178.

2. *Annual Ryegrass.*—None of the varieties of L. perenne being, as before explained, either annual or perennial in their duration, this term can only be applied in a relative or restricted sense—the former to those of the shortest, and the latter to those of the longest duration. Towards the end of the last century, the opinion became prevalent, that a strictly annual species of ryegrass had, by some means or other, become extensively cultivated, to the loss, injury, and disappointment of those who expected their grass fields to yield more than one crop of hay or pasturage. And as none of the agricultural writers of that period seem to have possessed much discriminating botanical knowledge, they, on consulting the works of early botanists, found that the name L. album had been applied to a species described as being strictly annual, and observing the thickly-grown plants in hay crops to be lighter coloured than the more exposed ones, growing in pastures or by waysides, they concluded the former to be the new surreptitious occupier of their fields—a notion which is not yet altogether exploded, although that a little correct investigation will shew that the name bore reference to a very different, and a then very pernicious inhabitant of their wheat fields—the poisonous darnell or L. temulentum of Linnæus. If a number of ryegrass plants are taken indiscriminately, and subjected to the same cultural treatment, [illegible] found that some yield a larger [illegible] stalks while some will [illegible] y [illegible] propagated by dividing repeatedly the plants, all of these may be perpetuated, *ad infinitum;* but if left to themselves, and allowed to mature their seeds, the [illegible] found to die out first, and the [illegible] longest, although three or [illegible] exhaust [illegible] the most lasting. As thus the shortest lived plants produce most seed, it follows that by continued seeding-off first crops, a preponderating proportion of these will ultimately be produced, and a corresponding shortness of duration will be induced in the crops. This is sufficient to account for the difference between the so-called annual and perennial ryegrass. But it is an undeniable fact that, under certain, or, more correctly, uncertain circumstances, the shortest lived varieties will live as long as the most permanent will do under others; hence the difficulty, and, in fact, impossibility, of determining by the results of growth whether a seed stock should come under the designation of annual or perennial. Ryegrass hay is almost exclusively the product of first crops, cut when the seed is in an immatured state, although fit for vegetating; and as the slovenly practice, long prevailed, of collecting hay-loft sweepings, which, after being cleaned with less or more care, were sold at a cheap rate, under the name of annual ryegrass seed, lightness of sample came thus to be deemed a characteristic of the genuine article. But as hay-loft sweepings now almost invariably contain an easily distinguished proportion of Italian ryegrass seeds, they are no longer saleable under the name of "true annual," for which the light seeds taken from among those of the most permanent varieties are now generally substituted; so that although they have the supposed essential character of lightness, they are, in reality, not otherwise different from the seed-stocks out of which they are taken.

3. *Common Perennial Ryegrass* may be described as a mixture of innumerable subvarieties, which, under ordinary circumstances, are capable of producing two years' pasturage, or three years', if these are very favourable. But if a crop of hay is first taken, and especially if the seeds are allowed to attain maturity before it is cut, the chances are that the pasturage will thereby be much weakened, as well as thinned in growth. To produce this and the other "perennial" kinds in greatest perfection, the seeds should be saved from second year's grass; but as this is attended with deficiency of crop, as well as a greater admixture of natural grass and other weed seeds, it is seldom practised further than for the purpose of yielding stock-seed, from which several consecutive seed crops are taken without materially reducing the durability of their progeny.

4. *Church Bennet* or *Church Bent Ryegrass*

is a variety noticed in the "Hortus Gramineus Woburnensis," as being grown in Berkshire. But it seems to have only had a local reputation, and it is not named in modern seed catalogues.

5. *Clydesdale* or *Carnwath Ryegrass.*—This was discovered, about 1792, by a Mr White, who, after following agricultural pursuits for a considerable period in various parts of England, became a resident of Carnwath about 1790. Having observed a patch of fine looking ryegrass in a portion of his ground, which he ascertained to have been in grass for eighteen years, he naturally concluded it to be a perennial sort, or at least capable of maintaining its place among strictly perennial grasses. Pointing it out to his friend, Mr John French, the occupier of the neighbouring farm of Lampats, who acquiesced in the high opinion he had formed of its merits, both set about its cultivation, and that with such success that they were soon able to supply the market demand for its seeds, which, in 1805, were sold at 12s. per boll of 4 wheat firlots, or about half an imperial quarter. About this time, farmers in the Upper Ward of Lanarkshire and neighbouring districts began turning their attention to the growth of ryegrass seed; and the fame of their products, as well as the great extent to which this branch of industry has since been carried among them, is in no small degree traceable to the seed-stock originated by Mr White, direct lineage from which was long looked upon by both growers and dealers as a sure indication of purity and excellence, as well as permanency of duration in its produce.

6. *Compact, Broad,* or *Dense-spiked Ryegrass*—(L. perenne compositum, of Sinclair, and others).—Of this there are many subvarieties, all distinguished by the denseness and shortness of their broadly-flatted spikes, which, in some plants, are bent or curved at the point, a form which early authors looked upon as constituting a distinct plant, and it is figured in Parkinson's "Theatre of Plants," 1640, under the name of "Phœnix multiplici spica nutante, or double Darnell-grasse with a bowing toppe." Being all shorter stemmed, and most of them less productive of foliage than the ordinary forms of L. perenne, these dense-spiked sub-varieties are unworthy of cultivation, unless as curious specimens in collections of grasses.

7. *Devonshire Evergreen Ryegrass*, or "Devon eavers," derives its name from being remarkably retentive of greenness throughout the winter. It is mentioned in Professor R Bradley's "Treatise of Agriculture," published in 1757, by the name of everlasting grass, and, notwithstanding, that it is of somewhat dwarfer growth than other cultivated sorts of ryegrass, it is still in considerable repute for pastures of more than one year's duration, and especially for those in ornamental parks, as well as for short grass lawns.

8. *Double* or *Monstrous Flowered Ryegras* —(L. perenne monstrosum, of Sinclair)—is a slender-growing variety, with short globular monstrous-like spikelets, which give to the spike an appearance of its being composed of double flowers. Sinclair discovered it in a meadow near St Ives, and cultivated it in the Woburn Grass Garden, but found it to b of no agricultural importance. It occasionally occurs in old meadow pastures, by road sides, &c.

9. *Dickson's* or *Dixon's Perennial Ryegrass* —This is one of those selected varietie which have had a comparatively local reputation, but its name now seldom appears in the catalogues of the leading seedsmen.

10. *Fine-leaved Perennial Ryegrass.*—(L perenne angustifolium, and the L. p. tenue, o Lawson and others)—which name is, however more strictly applicable to the next. This i frequently the most common form of ryegras in old meadows and pastures, and is easil distinguished by the abundance of its narrow root leaves, its comparatively few slende short stems, and its thinly seeded spikes characteristics which fit it in a remarkabl manner for fine lawn and play-green gras mixtures.

11. *Fine-leaved*, or *Slender Biennial Ryegra* —(L. perenne tenue, of Sinclair, and suppose by some to be the L. tenue of Linnæus which, however, is generally understood t be a very different species).—This has shor slender, wiry, almost leafless stems, and i very sparingly furnished with short, narro root foliage; its spikes are erect, and furnishe with few, distant, three to five seeded spikelets. Common on poor, dry pastures, wher it is perpetuated by shedding its seeds. It worthless for agricultural purposes, and th want of root foliage renders it too sho lived for the other purposes to which the la is applied.

12. *Holstein Perennial Ryegrass.*—A variet introduced in the third decade of this centu by Messrs P. Lawson & Son, of Edinburg from Holstein. In consequence of its reputed hardiness and durability, but being d

ficient in bulk of produce to the best home varieties, its culture was never prosecuted beyond a very limited extent.

13. *Mollé's Perennial Ryegrass* has long been a favourite in some districts, for alternate husbandry, its tall and slender habit giving a bulky, as well as fine crop of hay; but it is less suitable for permanent pasture, in consequence of being less permanent in duration than some of the so-called *perennial* varieties.

14. *Orkney*, or *Pollexfen's Perennial Ryegrass*—so named from having been originated by Mr Thomas Pollexfen, of Kirkwall, in Orkney. Its characteristics are a dark green colour, more than ordinary permanence of duration; and being fully as productive as the best grown sorts, it is held in deserved repute among growers wherever it is known; and more especially in the northern districts and islands of Scotland.

15. *Pacey's* or *Peacy's Perennial Ryegrass*—(L. perenne ramosum, of Sinclair)—a name which he seems to have applied in allusion to the branching growth of its barren, as well as fertile lower stems. This variety was pretty generally cultivated in both England and Scotland before the end of the last century, and its name still occupies a prominent place in seed catalogues. While some authors have named a Mr Pacey, in the uplands of Staffordshire, as having been its originator, others ascribed its discovery to a Mr Peacy, of North Leach, in Wiltshire. In addition to hardiness and durability, its characteristics, when allowed full room for development, are its forming, as before stated, branching bushy plants, with shortish and somewhat rigid stems, upright and rather compact spikes—the whole being of a darker reddish colour than those of most of the other cultivated varieties, compared with which its seeds are generally heavier. In the Woburn grass ga[illegible] produce, from a rich bro[illegible] flowering equiva[illegible] which was [illegible] so by [illegible] improved varie- [illegible] longer and [illegible] ice the latter [illegible] competition at [illegible] characteris- [illegible] results are not in unison with the vaunted properties sometimes ascribed to Pacey's ryegrass in seed catalogues; but such discrepancies are generally traceable to the too frequent practice of applying a favourite name incorrectly for the purpose of insuring greater sales or higher prices. In the present case, however, little or no injury is likely to arise from this practice, provided the essentials o hardiness and durability are retained. For in other respects, Pacey's holds a low ran among the leading varieties of L. perenne.

16. *Panicled ryegrass* (L. perenne paniculatum, of Sinclair, and the *Phœnix multiplic spicata panicula* or branched Darnell grass o Parkinson and other early authors).—This i a curiously monstrous-formed variety of n agricultural importance, distinguished by having compound or branching heads, instead o being simply spiked. It is occasionally to b seen in ryegrass fields, as well as by waysides; and, although it will reproduce it peculiar characteristics when perpetuated b division and grown in rich soil, we have faile in getting it to do so when grown fro seed.

17. *Roughead's Perennial Ryegrass.*—Thi is a name well known among growers in th Lothians, Fife, Berwickshire, Roxburghshir and several other Scottish counties, as wel as in the best agricultural districts of England. It is not, however, applicable to distinct variety; but to a mixed stock c several sorts, selected for their bulk of crop durability, and weight or quality of seed, b Mr David Roughead, of the firm of Roughhead & Park, seedsmen, Haddington, wh have been remarkably successful in takin premiums with its seeds at agricultural see competitions, the average weight of thes competitive samples being about 29 lb. pe bushel.

18. *Ruck's Perennial Ryegrass.*—A variet noticed in the "Hortus Gramineus Woburnensis," as possessing some good propertie and then (1824) occasionally named in see catalogues, in which it, however, no longe appears, and has therefore no claim to furthe notice.

19. *Russel's Perennial Ryegrass* (L. perenn Russelianum, of Sinclair), was introduce about 1820, by Mr Holdich, editor of *Th Farmer's Journal*, who named it in compliment to the Duke of Bedford, by whom th original plant was pointed out to him. I the Woburn grass garden its produce, at th time of flowering, was double that of Pacey' ryegrass, compared with which it yielded, a before stated, a larger proportion of nutritiv extract; it also produced an earlier sprin growth, and continued later in the autum The name still occasionally appears in see catalogues, but either it is misapplied or th variety has degenerated, as, although still d

cidedly superior to Pacey's, it is by no means so much so as the results here stated would seem to indicate.

20. *Stickney's Perennial Ryegrass* (L. perenne Stickneiensis, of Sinclair), was introduced by Mr W. Stickney, a celebrated cultivator in Holderness. And in the Woburn grass garden it was found to approach near to the last in habit and nutritive properties; but it has since been much more extensively cultivated than that variety, and still holds a first place among the most permanent varieties of ryegrass, being distinguished by its more than ordinary length of stem and peculiar light green colour, as well as by earliness in spring, verdant appearance in summer, vigorous late autumn growth, and hardy endurance of winter.

21. *Stoloniferous*, or *Spreading Perennial Ryegrass* (L. perenne stoloniferum, of Lawson, but not of Sinclair—see No. 24). This very peculiar variety was introduced from Germany by Messrs Lawson & Son, of Edinburgh, in 1834. Grown in their collection, it was fully a fortnight later in running to seed than any of the other varieties of L. perenne, although it yielded an early spring growth of long prostrate stolons or shoots, with an abundance of foliage, so that by the time the spikes began to appear, a single plant had formed a close tuft of 2 or 3 feet in diameter. These stolons, although lying on the ground, did not attempt to strike root till late in the season, and then very sparingly. Height of the flowering stems, from 15 to 18 inches, but the lower part being prostrate, and only the upper ascending this length, was about twice their actual height. Spikes, long and slender, spikelets remote, and few seeded. A remarkably distinct and interesting variety, but being only a spare producer of seed, and without recommendatory agricultural merits, its cultivation in Britain scarcely extended beyond the experimental grass garden.

22. *Sutton's New Dwarf Perennial Ryegrass.*—In Messrs Sutton's (of Reading) list of farm seeds for the present year, this is described as being a superior variety, which, from its fine green foliage and productive habit, is invaluable for pastures and park lawns.

23. *Thick-Stalked Ryegrass*—(L. perenn grossum, of Lawson).—This variety is occ sionally cultivated in France, from whence was introduced to Britain in 1833, by Mess P. Lawson & Son, of Edinburgh, but w found inferior to the best home varietie both in duration and bulk of crop, and a though deficient in spring produce, it stoo out well in the autumn. Stems remarkab thick, stiff, and upright, but rather short, c about 20 inches long; length of spike abo 8 inches, and very broad; spikelets remar ably long, eight to ten seeded, and place so that the point of the one reaches t the base of the next above, so that a though a most abundant producer of see it has no other recommendatory chara teristics.

24. *Viviparous*, or *Grass-upon-Grass Ry grass* (L. perenne viviporum, of Sinclair), i a curious, botanically interesting, but rath rare variety, in which the spikelets are con posed of small perfectly formed plants, i place of seeds. It is occasionally found i moist rich pastures, more especially in w autumns, and retains its greenness after th stems of the other varieties become ripe an withered.

25. *Whitworth's Perennial Ryegrass* (perenne Whitworthiensis, and stoloniferou ryegrass, of Sinclair, was originated by Mr Whitworth, of Acre House, who selected from his fore-mentioned unprecedented co lections, which, in 1823, contained sixt varieties of L. perenne. It has numerou root shoots or stolons, very fine foliage, an possesses the valuable properties of early an late growth, as well as permanency of duratio in an eminent degree; its tenacity of li being such that its originator found two three ploughings necessary to overcome i growth, when grown as a precursor to whea By the Woburn experiments it ranked wit Russel's (No. 19), and Stickney's (No. 20 in bulk of crop and nutritive propertie And although now less frequently mentione in seed catalogues than some other varietie it is still held in considerable esteem, whe ever its genuineness can be depende upon.

The Farm.

AGRICULTURAL STATISTICS.

STATISTICS of most kinds are valuable helps to the explication of many abstruse subjects. Without them no solid practical information can be gained, no basis can be calculated upon to build up a superstructure proof against contingencies that might arise, trying its stability, and leaving it very much, to the observer's eye, like the spectacle of the house that was "built upon the sand." With them, in any matter of interest or importance, the student and investigator can proceed, with a certain satisfaction that they have data to go by, and that if they err in generalizing upon them, it is only in degree. The winds of opposition may attack them, but they are the better able to resist them, for the foundation of their position is like the "house that was built upon a rock."

If statistics of a general kind are valuable for the satisfaction of mankind, for the mere sake of fortifying a position and strengthening an argument, how much more valuable must statistics of a kind be, that give a key to a knowledge of, year by year, the aggregate agricultural produce of the country? Commercial transactions [illegible] nching upon the pockets of ind[illegible] and [illegible] he nation, pas[illegible] present, and [illegible] wil [illegible] [illegible] diate [illegible] [illegible] icabl [illegible]

A quinquennial return, such as was suggested and moved for by Mr Pell, if not absolutely valueless, would be altogether unsuited to the wants and spirit of the age we live in. Groping in the dark, and speculating with a small coin for a great stake, held ou to allure and entice an immense multitude has already been sufficiently proved tc be an unlucky, as well as an unremunerative game in the long run. Imperturbable blindness as to what is not only going on in the world, but what has been done at home, agriculturally speaking, for the year, will seldom make a farmer many shillings the richer whe he reckons up his annual sales. Possibl some with large bank accounts at their bac may occasionally be successful, with natura shrewdness inherent, and dispose of thei goods in a rising market; but the convers frequently happens, and will happen eve with tabular statistics of produce before them but it is much likelier to form an exceptio with those who watch closely and profit b he signs of the times. As Mr M'Laga pertinently observed, that in 1847 Englan pent £20,000,000 upon foreign corn, an hat the want of information cost the countr n a single day's transaction £100,000, whic ght have been saved. Of course, had ou graph system been extended, as it is now urope and America, this could not hav rred, but instances of the kind shew th olute necessity of organizing a system th east faulty practicable, for diffusing info ion.

[illegible] one considers the immense impor [illegible] agriculture to us as a nation, th eeming population of which continually ou ows all that we can insularly supply in th of bread-stuffs and meat-stuffs, we are d to cast about in all directions to see how n best be supplied, and to take care, at ame time, that the resources of enterpris- en shall not be frittered uselessly away, hat they shall in good hands prove re- rative. Commercial men in other walks e leave no stone unturned to educate selves upon the extent and condition of arious fields of supply; and the telegraphs, in all directions, at home and abroad, like lightning the news from shore to Why should agriculture lag behind? ther why should a small minority put on ag to impede an excellent rotatory motion, ring up details which, when arranged by fficials under the auspices of the Board of e, are disseminated through the length breadth of the land; and farmers and merchants and consumers, are mutually ited by the news? If there be over- ing at all, it is not the overreaching cteristic of dishonesty, but purely busi- leverness, which we see every day; only it be accompanied by sterling probity, else lever "round" man will disappear in square" hole of his own creation.

at we verily desire to impress upon our rs is the necessity of unanimity in hing the statistics which the country eclared upon with no uncertain sound. olves no hardship to fill up the schedules are presented by the Board of Trade; s to the *espionage* idea propounded in ment by Mr Assheton, it is too palpable off to merit serious consideration. We lves attribute more to apathy and ssness on the part of those who fail or neglect to send in their returns, than to the fear of exposing to public view the acreage of any of the cereals in any district. It is a matter for congratulation that so many do respond to the call. In England and Wales there are something like 392,000 farmers, and of these only 22,000 failed to quote returns. In Scotland, where, as Mr Shaw-Lefevre puts it, the farmers are generally acknowledged to know their own interests better than in other parts of the country, there is only a-half per cent. that send in no returns, so that, upon the whole, seeing the thing is in its infancy, there is not a great deal to quarrel with. Why proprietors should step in and interfere in a matter of the kind, as stated by the Under-Secretary, is inexplicable. Both landlord and tenant are likely to be mutually benefited by an *expose*, such as we all desire. Moreover, it will tend to give a stimulus to what Mr Mechi calls the undeveloped power of British agriculture; and who is to profit by such an extension, but the landlord himself?

Now that science has unfolded that concentrated manures are more potent for certain conditions of soils than the favourite stable-yard manure of antient agriculture, and that farming upon correct principles is remunerative, notwithstanding all our foreign markets, we shall have an increase of capitalists investing in such an agreeable rural pursuit. Only let them understand, that the superintendence requires both skill and energy, and if either of these be not invested in by capitalists themselves, they will consult their own interests, by seeking and securing it, as they can readily do, in the open market.

HARVESTING CORN IN WET WEATHER.

is not often that farmers are favoured with a season like that of last year rrying out harvesting operations; and y be that the present fine weather ot last until the harvest is completed, all over the kingdom. At all events, it may be well here to glance at the subject from the point of view indicated in the above heading. We have heard of a cottager who, despairing of a cessation of the rain, and grudging to see his small stock of grain deteriorating, carried sheaf after sheaf into the kitchen, and dried them before the huge jaws of the fire; and we have also heard of a farmer who bought a lot of second-hand railway-truck waterproof covers, and used them in the field to cover his grain stooks during heavy showers. In both these instances there was an advance made to "applied science"—that is, there was advantage taken of certain means by which the end in view was, in a measure more or less complete, obtained. Better, even if first we fail, to attempt the application of known principles to the carrying out of what all acknowledge to be a good theory, than to fold the hands of listlessness, indifference, or despair, and to say nothing can be done.

We exclude for the present all consideration of methods proposed to modify the practice of the field as now carried out, to obtain the grain in a condition different from that in which it is now obtained; we pass on, therefore, to detail what are the probable ways in which the object in view may be met. There are many ways, ranging from the point of extreme simplicity up to that of more intricate detail. Of the simple modes at command of the farmer to obviate the evils arising from the exposing of grain in the fields to continuous and heavy rains, one is that to which already we have made a passing allusion, namely, the use of covers, or waterproof cloths, for the purpose of covering the stooks, or small stacks, in the fields. The farmer who made use of them remarked it was the best investment he ever made, and one which yielded the highest percentage of profit. Properly placing his stooks in the field, on the approach of rain the covering of them was but the work of a few minutes, while the uncovering was even more quickly done on the return of fair or sunshiny weather.

We do not name this method of securing stooks in the fields from the effects of heavy showers, in order to recommend its adoption as the best thing that can be done we do so to shew that a simple appliance may be, and is, often effective, and that when one is willing to do something to get rid of a difficulty, we may, and likely will, find something else; and although an apparently absurd saying, "something is better than nothing," it carries with it much that is worth remembering and noting.

A WORD FOR THE SPEECHLESS.

BOTH in Parliament and out of it, a great deal has been said of late on the cruelties to which our farm stock have been subjected in railway and steamboat transit; of which we may be permitted to remark, that more might have resulted in a practical way, and less been said and more attention paid to what could be done to prevent those cruelties, which we do not hesitate to say are as disgraceful to us, as Christian people, as they are a decided loss to us as a commercial one. There is, indeed, to our mind, nothing more melancholy than the way in which, as a people performing such high principles of action, we can condescend to talk of things which are essentially a disgrace to us, to profess boundless sympathy in words, on those subjected to evils which could be largely remedied, and yet to stop short of putting their sympathy in practical way. We have "palavers" in high places, and in places which are anything bu high in the true sense of the term, abou points which, in reality, concern the real welfare of the people in the smallest possibl degree; "palavers" about points which, i carried, would have no influence in raising the morale of the people, or adding one iot to their material well-being and comfort and all the while, grievances which are rea grievances, cruelties to man and beast, whic tend at once to depress and degrade them are passed heedlessly and carelessly over a things of little import.

Take for example that subject to which w alluded to in our opening remarks, and in looking at what hasbeen said about it—we wish w could say what has been done in connexio with it—we candidly confess that we are ashamed of those who, in high places in Parliament, and Chambers of Commerce, and the like, have not been ashamed to make much more of the difficulties which they say is in the way, of treating our animals consistently with the dictates of true humanity, to say nothing of those of commercial or trade economy, than to shew any real desire to get rid of those difficulties. We unhesitatingly appeal to those who, like ourselves, have had frequent opportunities of witnessing the way in which our animals are conveyed by steamboat or by rail, if there is not in their mode of treatment features which are disgraceful to us in every aspect in which they may be viewed—details of treatment which are more like the emanations of devil's thoughts than of Christian men's actions. It is a libel upon our capability to deal with difficulties to say that the animals cannot *in transitu* be treated in such a way that torture will not be the result. Objection has in high places actually been made—we say actually—to enactments which would compel men to behave to animals intrusted to their care as sound humanity would dictate, on the ground that such enactments would interfere with the liberty of the subject, and throw humanity round our trade. Well might we say with the poor victims of the French revolution, " Oh, liberty, what horrors are perpetrated in thy name ! " Is the liberty to be all on one side? Is there to be liberty to any extent to exercise a cruelty which—and we know well what we say—is absolutely fiendish?

When we hear talk such as this, that to stop cruelty is an infringement upon the liberty of the subject, what can be more appropriat in our thoughts, than the story told of th Southern planter who, years ago, came to thi country with his slave, to whom he was givin a chastisement, and when he was told, th here, at all events, he had no right to this– replied, " a free country, this, do you call —a fine freedom, when one is not free to lic his own slave !" We hope, but we confess w hope but faintly, that we shall have n more of such fine-spun theories. The ev in question is so clamant that it behove us, once and for all, to legislate f those poor dumb creatures who have n power to help themselves, who cannot tell their woes. "The merciful man is merci to his beast." Who amongst us would not lik to be classed amongst those who are merc ful? All honour, therefore, be to those wh have been for some time, and are now e deavouring to bring about a better conditio of things, who are anxious to see the low animals intrusted to our care so dealt wit that we shall have no qualms of conscienc no remorse as to what that treatment is. W feel ashamed to put the matter in any oth light than that of the true one; yet we ma say that the best interests of those who a dealing in cattle are concerned in the proper treatment, so far as their pockets onl are concerned. To such, the consideratio that it pays best to be kind to the anima intrusted to their care, will be, or should b of weighty moment; but we believe our reade to be of those who view the matter from far higher standpoint, who conceive it to b not merely a duty but a privilege to carry o the principles of humanity.

THE SUMMER GRAZING OF STOCK.

IN an article under this title, which we gave last month, having special reference to cattle, we pointed out the necessity of attending to the condition of the pastures in which the stock was put for grazing, if good results were desired. If a good condition of pasture is necessary for cattle, it is much more so in the case of sheep. It is one of the most striking features of modern farming, the rapidity with which sheep a fattened for market, compared with the o practice. Much of this rapidity of fatteni is, of course, dependent upon breed, the ca with which animals are selected, kept health, and the generous artificial and ext food which is generally given them; but st the primary resource is the pastures. Eve farmer knows how much more rapid t progress of his sheep is with a "good bite" of nature's providing, even without the aid of artificial or extra food, compared with that when the bite is poor and scanty. Hence, in preparing for the summer grazing of sheep, care should be taken to have the pastures in good condition. They should be well "rested" in winter, or in early spring, and the sheep not turned on them till the grass is in good condition. When this is the case, it will even then be advisable to stock the pastures rather lightly, putting in the best sheep only, so that they may be "helped forward," stocking them fully only when the grass is in "full bite." Care, therefore, must be taken by all the improved modes at the command of the farmer, to improve the condition of his pastures, not only by increasing to a maximum the surface growth, but to ensure that growth being as free as possible from weeds. In one of the papers recently given (page 20) on the subject of weeds, a remark was made as to the effect of certain top dressings of artificial manure upon the reduction of weeds, which appeared suggestive. We believe this to be worthy of a trial; but, failing it, if weeds abound, the only way to proceed with them is rooting them up, or to keep cutting them down with a scythe; on the results of which processes we also refer the reader to the papers aforesaid. The pastures being well stocked—but not overstocked, a most false and pernicious economy, if, indeed, the word can be used in connexion with such a practice—the sheep, if left quietly will soon make rapid progress, requiring but little more attention than a general supervision to see that the animals remain healthy. But this process will be all the more rapid and satisfactory if extra food, in the shape of oilcake and corn, be given them. A double benefit is obtained from this liberal practice: for not only are the sheep vastly improved in condition, bu the land is increased in fertility through the increased value given to the manure.

Much that has here been said as to the summer grazing of sheep fattening for market will apply to the breeding flock and to the lambs. When the lambs are weaned, the ewes should be taken to a pasture of inferior quality, so that the supply of milk may be lessened, and complaints arising from over milk prevented. They may, after a shor period, be supplied with a limited supply o mangolds, which supply ceases as the growth and quality of the grass improves; but they will be all the better if occasional feeds of corn or cake be allowed them. Some stop the supplies of extra food as soon as shearing or clipping has been performed, but we would advise them to be continued for some time at least after this critical time, especially if the weather is cold and wet—"good food is good heat."

The ewes at this time will feel all the advantage of having had a supply of oilcake while nursing the lambs, an addition to the food which has a remarkably good effect upon the health and condition both of the sheep and of the lambs. The lambs, during their summer grazing, should not fail to have a moderate supply of oilcake, more especially in the case of those whose condition is not so satisfactory. A judicious allotment of pastures is also advisable, giving the best grasses to the poorest lambs. The great point to be aimed at is having the stock in a progressively improving condition. This is indeed of essential importance, and should never be lost sight of by him who aims at being a successful breeder and feeder.

SHEEP SHELTER.

We have repeatedly taken occasion, in the course of various papers in this Magazine, to allude to this subject, and to impress upon our readers that it would be worthy of their consideration whether it would not pay to have shelter, however rough, especially for outlying districts, in which the animals could not speedily be brought to more sheltered spots. Many, doubtless, would think that this recommendation was really a refinement in farm practice; of those who so did, we can imagine that a slight change of opinion would be the result of such disasters as arose from the ungenial and altogether unexpected wintry weather of the month of June. It is not often the lot, if, indeed, it ever was the lot of any farmer now living, to see, within a day or two of midsummer, the hills white with snow, and to find, as many found, that sheep by the dozen were killed h the cold. But a very small expenditure the way of providing shelter to which the imals could have gone, might have saved a y large loss. It is right, however, to say that subject is one to which marked attention being paid, and that many advanced mers are now convinced that sheep shelter a good thing to have. But the subject has vider application; for not only is shelter for eep in outlying districts advocated, but also elter for sheep as part of the farm steading; d if shelter is good for cattle and other ck, it is difficult to see why it should not for sheep. On this point we have en from time to time the experience of ose who have adopted this practice, to iich we add the following, from the *Journal* the Royal Agricultural Society:—

Having this year rebuilt a large part of my farm ildings, I appropriated one shed, 90 feet long and wide, for sheep. This, with a fold proportionably ge, will accommodate about 100 Leicester sheep. shed was not finished till January, when I ned into it 80 Leicester hoggs, then from nine to months old.

These sheep when in the field had consumed about y basketfuls, called skips, of cut turnips per day, sides oilcake. On being brought into the shed, to surprise they were immediately only able to consume thirty baskets, and before a month had elapsed quantity had decreased to twenty-five baskets, thus nomizing one-half the turnips; they also ate less cake. I found, nevertheless, that their increase was rapid this year as it was the year before. I did not e the trouble to repeat the same experiments I then de, but I selected four sheep, which I marked and ighed once a-month, and the result is as follows:—

		stones.	lbs.
January 1	No. 1	11	4
,,	,, 2	10	8
,,	,, 3	10	8
,,	,, 4	10	5
		—	—
Total weight		42	11

				Increase during each Month.	
		stones.	lbs.	stones.	lbs.
February 1	No. 1	12	2	0	12
,,	,, 2	11	13	1	5
,,	,, 3	11	12	1	4
,,	,, 4	11	4	3	13
March 1	,, 1	13	3	1	1
,,	,, 2	13	7	1	8
,,	,, 3	13	3	1	5
,,	,, 4	12	2	0	12
April 1	,, 1	13	12	0	9
,,	,, 2	14	6	0	13
,,	,, 3	14	3	1	0
,,	,, 4	13	0	0	12
May 1	,, 1	14	2	0	4
,,	,, 2	15	0	0	8
,,	,, 3	15	2	0	13
,,	,, 4	13	12	0	12
		—	—		
		58	2		
Deduct weight Jan. 1,		42	11		
		—	—		
Increase in 4 months		15	5		

On this increase I have one or two observations to make. It will be perceived that Nos. 2 and 3 have increased the most; they have never been amiss. No. 1 refused food for two days in February, and had a dose of salts. No. 4 has been twice amiss. This shews that if a sheep does not feed, even for two days, it considerably affects his weight.

Of the eighty sheep put up, I sold about 50 at Rotherham, in March, clipped, at from 42/ to 48/ per head, and I believe no better hogs have been seen at that market this year. The rest I am keeping for a prize show, which takes place at Blythe, in Nottinghamshire, on the 28th of May, where a prize is given for the twenty best hogs.

It will also be observed, that the increase during the months of March and April was not so large as during January and February.

I think the greatest profit would be made by shedding them for about ten weeks. By giving them cake and a little crushed barley, I think you may gain from 33 lb. to 40 lb. per head in that time; (No. 2 gained 55 lb. in 12 weeks). Their increase in value cannot, during that period, be less than from 15s. to 20s. per head, and in this way you may feed off two or three lots during the winter. In ten weeks they consume half a ton of turnips each; thus, with artificial food, 1 acre of 30 tons, will feed no less than sixty sheep. The artificial food will cost from 6d. to 1/ per week.

The 28 hogs which I am now feeding for the show cost, per week, as follows:—

2 bushels of split beans, at 6s. per bushel	£0	12	0
1½ bushel of white peas, at 5s. 4d. per bushel	0	8	0
3½ stones of linseed cake, at 1s. 3d. per stone	0	4	4½
5 stones of best clover hay, at £4 per ton	0	2	6
1 stone of salt	0	0	6
	£1	7	4½

On these animals I spare no expense; and it may be observed that the linseed cake has a very small part of the whole cost, although they have as much of it as they will eat. If, in addition to cake, they have a very small quantity of peas and beans in spring, and of crushed barley in winter, I am convinced their progress would, in general, be sufficient and satisfactory. Barley is not so good in spring as in autumn, when the turnips are succulent. I have found it very advantageous to pull the turnips, which were swedes, and pour water over them, when used late in spring, say April and May.

I have two observations to make—1st, I think a great deal of the success depends upon a boarded floor. My sheep never had the foot rot, whereas some of my neighbours who tried the experiment without such a floor, were forced to turn their sheep into the fields again, as, whenever their feet got wet from the straw being saturated, the foot-rot comes on. The expense of the boarding (rough slabs) was about £25, and it can be removed at any time, and the shed will then serve for cattle or horses. 2dly, I find the shed as advantageous now in the hot weather as it was in the severest part of the winter. My sheep are reposing quietly under their shed, whilst those in the field are panting for breath.

It has been observed that this system of shed feeding is robbing the land of the manure and treading of the sheep, and, consequently injuring the barley and the oat seeds which follow. Now, my custom is to draw only one-third or half my turnips, and by giving oilcake to the sheep which consume the other half on the land, to get as good barley and seeds as if I had eaten all the turnips on the land.

At the same time (if I can believe the results of my own experiments) I find that the turnips, if consumed under sheds, go so much further, and at the same time the sheep thrive much faster than they do in the field. I think it is worth while considering whether the whole crop of turnips might not be drawn, and the manure returned to the land, or its loss supplie by rape dust or artificial manures drilled in with tl barley. The treading of the sheep, I should thinl might be replaced by rolling, especially with Cros kill's (of Beverley) roller, a most useful machine.

It is rather remarkable that this description of she feeding should have come from a sand farmer. M land is light, and peculiarly favourable to sheep whe on turnips; and if it is worth my while to feed shee in sheds, the advantages to heavy land farmers mu be incalculable.

DEATH OF SHEEP THROUGH EXPOSURE TO COLD AFTER SHEARING.

By Joseph Gamgee, Sen.

Owing to the cold stormy weather, unusual in England at an advanced period in June, reports of great losses of sheep by death after shearing, occurring in Yorkshire and Westmoreland, appeared not only in the various local newspapers, but also in the London journals, paragraphs from which are here subjoined:—

The *Times*, of June 18, says:—"The storm from the north-east which succeeded to the thunderstorm of Tuesday afternoon, and continued during Wednesday, has caused great loss to those Yorkshire farmers who resort to early sheep-shearing. Compared with the sweltering heat of last June, the present year presents a great contrast; but, as a rule, sheep-clipping in June is attended more or less with danger, and so it has this year proved. The northern escarpments of the wolds felt the full force of the gale, and it is on these hills that the great loss has occurred, fat sheep and ewes alike dying from the cold and exposure. Sheep clipped on Tuesday were turned out into the rain and cold to be found dead under the hedges next morning, and even yesterday clipped sheep were to be seen huddled in the ditches for a little shelter. The losses from sheep already dead have been more severe han farmers will admit, one farmer having yesterday sent a load of seventeen dead sheep to the manure vorks. In some other cases the starved sheep have been housed, and are fed with gin, but many will [illegible]"

The *Daily Telegraph*, of June 19, says:—"Sheep-[illegible] in practice is not altogether such a pretty pastoral affair as those innocent citizens may imagine who derive their notions of it entirely from landscape painters and idyllic poets. Like most other things in rustic life—like cottages, for instance, and village fairs [illegible] not look prettier on close inspection. On [illegible] considering the roughness of the process, it [illegible] blessing that, as a general rule, the wind tempered to the shorn lamb. This year, however, the shorn lambs, especially in the north, have been less fortunate. Early shearing is at all times somewhat dangerous; and the Yorkshire wolds, as we said the other day, have been recently fringed with snow, while the wind has been blowing fiercely on the hills [illegible]ess them. Not only have clipped sheep been [illegible] under the hedges [illegible] the best huddled together, sick and shivering, in the nearest ditch: bı the farmers, it is said, do not like to confess how maı they have lost—an ugly sign."

The concluding sentences of these quot tions demand a passing notice—"Why d farmers not like to confess how many shee they have lost?"

I doubt whether this question can elic an answer from farmers themselves. Waı of knowledge, of cause and effects, is perhaı the best answer that can be found; but th implies ignorance and absence of care, t which few are liberal enough to confes though it fell to them as a heritage uncoı ciously. It is this tenacious clinging to error as we find them, not only as regards shee shearing, but extensively in the manag ment and treatment of live stock, that coı stitutes the chief impediment to progre of knowledge. When the cattle plague ha been imported in our midst, there was general conspiring to deny the fact, an everything about it necessary to the checl ing of its ravages; so with pleuro-pneumoni &c. And if we tell a man his horse is lam we incur the risk of losing a friend or makin an opponent. I have been in the habit telling the public that all horses are injured b clipping and singeing, that are subjected t either process, and that unknown numbers aı destroyed by these procedures. But thes absurdities, which have not even the redeen ing attribute of immediate gain (except wit horse dealers) to recommend them, are n yet ripe for discussion, and, therefore, a that I have made out by fifty years observ tion can avail nothing, or very little at presen yet the time will come when reason wi assume the mastery over prejudice, and the my observations on the cruelty of denudin animals wantonly will serve as collateral supports for the reform of these abuses.

But, coming to the subject of this notice, death of sheep from cold through shearing, how is recurrence of these disasters to be provided against?

Happily, we are not without well-grounded answers to the various phases of this question. As in all cases in which the health and life of animals are to be considered, remedies must be brought under notice as an after necessity. The laws of health, character of deviations and causes, are the first, and, with exceptions only, answer the whole purpose, so far at least as to secure the interest of stock-owners in general and flockmasters in particular. In the cases noticed in my paper in *The Country Gentleman's Magazine* for June, of sheep shorn early in March, obvious cruelty was demonstrable; and to shear sheep at that season in our climate, for any motive or assumed interest, is as contrary to the common good, and ought be provided against, as much as the destru tion of corn stacks by fire, by whomsoeve But the cases of sheep dying from sheari in June are exceptional, and, as such, requi special notice.

In order to appropriate to our use t sheep's fleece of wool, this must be done wi the least possible discomfiture to the anim and therefore not till summer time, a warm weather sets in; but if cold a stormy weather sets in during clipping tim or soon after, adequate measures should taken to diminish the consequences; and t most effective are, the placing the flock und cover, giving dry straw for the sheep to on, and liberal feeding, without the necessi of exposure to the weather. This brings to the important question for stock farme with our present knowledge of covered far yards.

THE BEST MODE OF HARVESTING GRAIN CROPS.

BY JAMES HARLAND.

[Read before the Boroughbridge Agricultural Society.]

THE subject I have to deal with divides itself into two parts—1st, The proper time at which grain may be cut; 2d, the best means of harvesting. Wheat, the most valuable, demands first consideration.

IT IS ADVANTAGEOUS TO CUT WHEAT A WEEK BEFORE THE GRAIN IS RIPE.

This saves time, improves the quality of the grain, and enables the crop to withstand the effects of rain for a much longer period than if left standing until fully ripe. This is no new theory, but was the practical experience of old men whom I have known, agriculturists who calculated the cost, and had long ago arrived at the conclusion that the plan was economical. Experiments are recorded proving that wheat cut when raw, say a week or ten days before being fully ripe, gave analytically in weight and quality of produce 20 per cent. advantage over that which was left until dead ripe. As this is an important question, perhaps I may venture to quote from Mr J. Chalmers Morton's Cyclopædia, where it is written "wheat should be cut as soon as it has passed from the milky to the doughy state; if deferred later, the grain is thick-skinned and lighter to the bushel—and is very liable to become discoloured by rain, either before it is cut or in the stook; it is, moreover, more apt to sprout. The straw, too, breaks down; the crop is more expensive to cut, and it is impossible to make so clean work as when the operation is performed at the proper time. I have no doubt that there is infinitely more loss sustained in Britain from allowing wheat to become dead ripe, than from cutting it when too law."

BARLEY NEEDS TO BE RIPE WHEN CUT.

Barley is the only cereal which needs to be perfectly ripe when cut, so as to acquire the correct colour malting—yet, if allowed to stand uncut until o ripe, there is great risk of the ears being broken by the wind. The bean crop is considered ready cutting when the leaves begin to fall or beco withered, not allowing excessive ripeness, as grain is apt to shed out in cutting.

THE PEA.

The most hazardous crop to deal with is the p which will not bear being left to ripen, else the s quickly sheds, and in damp weather ripe hau quickly spoils.

MODE OF REAPING GRAIN.

We have now to consider the most economical m of reaping wheat, oats, barley, and beans. Th used to be but two modes, viz., the sickle and t scythe. Work done by the sickle was neater than scythe, but the progress was too slow, and wh hands were scarce, harvest work was retarded—her the scythe became a necessity, although neat farm of that day declared that only slovens used the scyt amongst wheat. Happily, the reaping or mowi machine was invented and came to our aid, perfor ing the operation with the neatness of the sickle, a in every way better than the scythe, and spares t best hands for other operations. Labourers have s that they have earned more money in harvest at pie work with the scythe than since the invention of t reaping machine. But at what cost? Excessive to To me it is a great pleasure when any invention al viates human toil—none more valuable than the rea ing machine; for harvest work needs to be pushed during the heat of the day. The question arises—

WHICH IS THE BEST DESCRIPTION OF REAPING-MACHINE?

The one or two horse manual, the self-raking sheafer, or the swathing-machine. It would ill become me in this place to endeavour to define. Suffice it, if I venture to reply, that machine of lightest draught, which leaves the crop in most convenient form for the succeeding operations with the least manual labour. I am of opinion that if a machine requires manual labour beyond the drivers of the horses, it is imperfect, and needs improvement. The manual delivery reaper is very valuable under suitable conditions. Some men are very expert with rake putting off the corn, but I have often seen very sad work done by careless or incompetent men. That is one reason why I prefer a machine which leaves the corn in swathe. Again, if there be clover growing amongst barley, it is an advantage sometimes to leave it exposed a while, it is more safely left overnight in swathe than in sheaf, drying more quickly after rain. During eleven seasons I have used Burgess & Key's machine, with screw delivery, which lays a neat swathe, has worked well, and at little cost for repairs. I have heard of 28 acres being cut by one of these machines in a long day, but I think 18 or 20 acres, with change of horses, is a fair quantity. Of course the quantity must be further reduced if the crop be very heavy and twisted, so that it be necessary to run empty on one side. It is so long since I used the scythe that I cannot now refer to calculations clearly defining the economy of cost in the subsequent operations, but this I know, that there is material saving of time, and the work is better done. It is worthy of remark, that if a labourer has ever taken up after a good mowing machine, that labourer is afterwards shy about following a scythe. The design of machines to lay in sheaf without manual aid is economical, and I hope to see it brought to perfection for heavy work. When the crop has been cut, and is lying in swathe or sheaf, what is next to be done? By means of an ordinary harvest rake, the sheaves, about 1 foot in diameter, are laid into bands drawn from swathe and laid ready by children, followed by binder, who makes the sheaves tidy and throws them aside into straight rows for convenience of stooker. The men who stook or set up the sheaves should be the most expert that can be found, quick, and careful to handle the sheaf, so that when placed in stook that part of the band where the ears are connected be out of reach of rain.

NOTHING CAN MAKE UP FOR BAD STOOKING.

Eight sheaves of barley or oats in a stook, so placed as to form a perfect roof, with ends east and west and in line, so that the least possible space be passed by the rake. If this be done, a great deal of rain may fall without much damage, and if it be necessary after much rain to remove on to fresh ground it may be accomplished by two men grasping firmly four sheaves each without destroying the form ; but less moved the better. If, on the contrary, the sheaves be carelessly placed at first, the base becomes distended, the back of the sheaf is broken, and the rain runs in, instead of flowing off. One of the best samples of barley I have had stood out for twenty-seven days in 1866, when there was much rain. It was well stooked, afterwards dried by fine weather, and made 50s. per qr. These remarks on stooking apply likewise to wheat, with the addition of hood sheaves, which are necessity when the formation of an ear of wheat i taken into consideration. I know that there is i many minds a prejudice against hooding wheat formed perhaps in the days of the scythe, whe sheaves were often untidy. Now there is hardly a excuse for untidy sheaves. I have seen the operatio so badly performed that it was merely waste of time but when well finished and the hoods tied on, the grai will feed much better than when left exposed, and b preserved from the influence of bad weather. Trul this adds about 1/ an acre to the expense, but 1/ pe qr. is gained in the colour of the wheat, to say nothin of the comfort, when rain is falling, of knowing tha every care has been taken.

CONCLUSION.

It is almost needless to add that after raking betwee stooks with a horse rake, wheat rakings should b bound up ready for forking, causing less trouble tha when loose. In fine weather the corn will be read for carting in about eight days, but that must b ascertained by observation ; circumstances vary Whether the stack be round or oblong does not appea to me of much importance, the condition of the cor is the criterion. The chief matter is the construction the stack. I have seen damage at the base and ro which might have been avoided. If a round stack i to be built on a base of straw or thorns, the first c central sheaf should be placed erect, with others restin round it, the ears of each succeeding course restin on the straw of a previous sheaf, so that not a ear of grain may suffer from damp; if an oblong stack we stook down the centre for the same reason. Whe reaching the eaves and while roofing, the stack mus be well filled, so that the roof be correct in form finished with a forkful of straw ; then if a shower fal before thatching it will be thrown off, not into th stack. After thatching, the eaves should be cut an side shaven, so that loose corn be applied to its prop use, and prevent snow resting on the stack side Coco-nut fibre is useful for fixing the thatch, bein more durable than common hemp twine and less e pensive than tarred cord.

DISCUSSION.

Mr BAINBRIDGE said he agreed with Mr Harlan that it was wise to cut wheat early, as his experienc in the matter had always convinced him that early cu ting was the best. There were two dangers to en counter in cutting late, namely, that the corn was liabl to shake, and that it was also thick in the skin. I would be well if some cheap apparatus could be in vented for use in bad weather in drying corn. In th West Riding, the large cloth manufacturers did no now dry their materials in the field. The cloth wen in damp at one end of a room adapted for the pur pose, and by means of an apparatus it came out at th other end quite dry. Why could not some simila plan be carried out with regard to the drying of corn In the reaping of the pea crop he recommended th use of a horse rake.

Mr INGHAM said, in the reaping of that crop, h had used both the Irishman and the horse-rake, but h preferred a very simple thing, which he had got of wheelwright. It was merely a wooden rail with pin in it, and it gathered up the peas without the earth. The whole apparatus did not cost more than half-a crown.

IMPROVEMENT OF THE TEMPERATURE OF THE SOIL.

THE last paper for the present session of the Cirencester Chamber of Agriculture was read on "The Improvement of the Temperature of the Soil in connexion with Cultivation," by Mr David Greig, of Leeds.

We give the following extracts from the paper, and the discussion which followed.

Mr GREIG said—I am satisfied from practical observation that this subject, more than any other in connexion with agriculture, demands our investigation and consideration ; and this fact I offer as my apology for tendering remarks on a subject involving great scientific and chemical research. The remarks I intend to submit have been suggested by close observation of the result of the crops on steam-cultivated land and garden husbandry, compared with that on land cultivated in the ordinary way by horses. The improvement of the temperature of the soil is directly accomplished by the improvement of its drainage, its aeration, and its power of absorption and evaporation. I think it unnecessary to refer to the drainage, as most farmers are alive to the great advantages to be derived from it. I shall rather confine myself to contrasting or comparing the different kinds of cultivation as assisting in completing drainage, allowing aeration, facilitating absorption and evaporation, and thus securing a higher and more uniform temperature of the soil. It will be convenient to consider the subject under two heads; first, in its relation to heavy land ; and secondly, in its relation to light land ; each of these conditions of the soil, in my opinion, requiring different treatment. In the cultivation of heavy land, I am of opinion that the great benefit from the action of the atmosphere on it, in its loose and cultivated state, is not duly considered and taken advantage of. Take, for instance, a piece of heavy clay land—a wheat stubble—which is intended for a green crop the following year. My impression is, that in no case should any subsoil be brought to the surface, but that the land should be stirred to the greatest depth possible, and after being thus stirred that it should not be touched again during that autumn ; the manure, of course, being applied before the cultivation, so as to become thoroughly mixed in the soil by the process of stirring. In the spring I consider that all green crops on this sort of land should be sown entirely on the frosted mould, and at that season all treading should be avoided ; the reason for this precaution being that the land, although beautiful on the top, is in such a state at the bottom that every footmark of the horses will compress the subsoil and leave a place for the reception of water and its accumulation in pools under the surface. When this is the case it must be quite clear to every mind that the temperature of the land will be seriously unequal, and that the roots of the crops will naturally avoid those places which are thus trodden. It is of the utmost importance that all land should be kept in as even a temperature as possible, which cannot be the case when horses' footmarks exist. After having prepared the land and sown the crops entirely without the use of horses, it will be found that the next autumn's work will be done with one-half the power otherwise required ; the land will be in a uniform condition and free from clods. Of course, there is no objection to the use of horses for the hoein of green crops, provided the land be perfectly dry ; b if it be in the least wet, by all means avoid using them It is occasionally argued that horses are necessary f treading and consolidating strong land : from this strongly dissent. Cereals and clover crops doubtle do better on a firm surface, but this can be secure without the treading of horses' feet, which otherwi do so much damage. From what I have observed, believe the best method of putting in cereal crops merely to scratch the surface, loosening no more so on the top than is required to cover the seed ; but, course, I am supposing that the land has bee thoroughly loosened for the previous green crop. . perfectly even and consolidated bottom is thus o tained, always taking into account that no horses a allowed to trample on the land ; for if they are, may be necessary to loosen the land to a considerab depth, to take out the hard footprints. This point merely scratching or combing the ground for cereal clover crops will, in my opinion, be found to be much greater importance than is at present antic pated, and will tend considerably to lessen the nu ber of operations required in cultivation. T cultivation of clay land is a matter of which we a almost entirely ignorant at present. By forethoug and management the deep work can all be done in few weeks in the year, and if the land is never touch when wet, one-fourth of the cultivation at prese required will be quite sufficient ; and I am of opini it will be found that clay land properly managed, wi ample force at a given time, will be much more pr fitable and much more easily cultivated than what ordinarily considered the finest land in the kingdo Secondly, in dealing with light land, although t case is rather different, I may remark that here t results of very deep cultivation have been more quick seen than in heavy soils. Light land frequently has pan under it, owing to which a great variety of te perature, to which I have already referred, prevails a yet greater extent than in heavy land. My impre sion of the reason why light land exhibits the ben ficial results of deep cultivation sooner than heavy that by the scarifying and breaking of the pan, which allusion has been made, the roots spread mu more ; that any excessive supply of water is allow to pass away more freely ; that the soil retains a pr per temperature for a longer period ; and the pla penetrate much deeper than would otherwise be t case, thus receiving proper moisture for a great length of time. There is, consequently, less variati in the temperature, and the growth of the plant is n stopped in a dry time. In all light land cultivatio deep, loose, aerated soil is necessary. When spea ing of deep cultivation, I mean that the land shou be stirred and loosened deeply, and only partial brought to the surface with a great degree of cautio Indeed, I would almost venture to say, that pr vided any class of soil be thoroughly loosened, need not be brought up at all. In the cultivati of light land much more expense will be incurr than in the cultivation of heavy land. The s will be much more liable to grow weeds, and w require more operations in its cultivation. To ov come this difficulty, I am of opinion that land of t nature should be continuously covered with crops of some kind; say, for sheep food, ploughing down, or hay. In the case of light land, it is important to get it very open, so that the atmosphere may act upon it; and owing to the rapidity with which light land closes on the surface, one result of keeping it full of crops is that it will receive much more benefit from the atmosphere than would be possible in a bare state. With regard to the respective merits of ploughing and cultivating, I am fully persuaded that the plough is needed in dealing with the surface, and that no plough should go below 4 inches or 5 inches deep. Another point to which I wish to ask your attention is that of putting in seed. It is important that all the seeds (whatever the state of the land) should be sown with some kind of manure, specially suitable to such seeds. For the successful growing of any plant, it is indispensable that it should obtain a large supply of nutriment at the precise time that the innate force of the seed is exhausted. To sum up my remarks, let me say:—Firstly, that deep cultivation is the great point, and deep ploughing is injurious. Secondly, that exposure of the soil to the weather, and the cultivation of the land only when it is dry, are essential to success. Thirdly, that by keeping horses from treading the land, one-half only of the labour will be required. Fourthly, that by deep cultivation there is a greater certainty of getting crops into a healthy condition, the result of an even temperature in the soil; the temperature of the air being of less moment to the healthy state of the plants than the temperature of the soil itself. Fifthly, that the early development of plants is of vital importance to their future growth. Sixthly, that in heavy lands such crops as clover, tares, or any crop which has a large amount of roots, should be grown so as to keep the soil in a proper condition and mechanical state. Seventhly, that in light land the surface should be continually covered by crops bearing as much leaf as possible, so as to convey to the land, from the atmosphere, its manuring properties.

The CHAIRMAN, alluding to the remarks contained in Mr Greig's paper, said that he felt almost inclined to agree with that gentleman that the cultivation of strong land was still in its infancy.

Professor WRIGHTSON said that perhaps Mr Greig had, through delicacy, not touched on the matter of steam cultivation. The steam cultivator was a larger and more powerful instrument, and by its use the plough would, in a very great measure be dispense with. As to deep cultivation, there could not exis two opinions. He had heard one great authority o agriculture say, that deep cultivation should be a substitute for drainage. Such an assertion could not, c course, be allowed for one moment. He wished t have a question answered with respect to steam cultivation. From what he had been told on the subject the use of steam was much dearer than employin horse-power. The advantage of steam cultivation wa in the superior quality of work performed and a larg crop. But there was that class of land—light land— which could be as deeply worked by horses as b steam. Was not the employment of horse-power o such land better than steam? Were not such soils a perfectly worked by horses and as cheaply worked and was not the amount of pressure by the horses c absolute use, and the state of the soil under horse cultivation as good or even better than under steam cultivation? He was aware there were advantages wit respect to clay soils in the use of steam power, but h asked for information on the point.

Mr SMITH said he ploughed nearly 6 inches dee on his farm. Mr Greig had spoken of deep cultivation for light land, but in many instances the pan wa a complete rock. He wished to know how Mr Grei would deal with land of that description. He though deep cultivation by means of steam power on stron land was very good.

Mr J. EDMONDS said he was of opinion that dee ploughing by means of steam ought to be condemned but he thought they could not plough too deeply wit horses. As to the time for cultivating, he thought i they wished to use steam for deep cultivation the ought to commence in the autumn, in order to get ri of docks, thistles, and other weeds, which were s troublesome to the farmer. As to the depth, he di not think they ought to exceed 4 inches.

Mr GREIG moved the following resolution:—"Tha deep cultivation is essential to the profitable cultivatio of the soil, and deep ploughing by steam is injurious. That exposure to the weather, and cultivation of the land only when it is dry, are essential t success."

The resolution was put, and carried unanimously.

A vote of thanks was then proposed to Mr Greig for his interesting paper, which was also carried unanimously.

"ENGLAND IS NOT HALF FARMED."

AN octogenarian, Mr Robert Watson, of Wingham, Kent, who writes with the buoyancy of boy, thus speaks of the crops and the present state of farming in England. Would that thousands of younger men could see with the same glasses! "I am getting my bustle over with my seeds, and have commenced my usual walks by the footpaths to inspect the crops. There are in this great corn county only a few fields of wheat that will yield an average crop. On all sands, gravels, chalks, &c., there is not half an average crop, the wheat not being knee high, and has been as yellow as gold. As to barley, there is not one good field in fifty, many not one foot high and others not knee high; not half an average crop. Peas are bad and many not the seed again. Beans a ver partial crop. Oats, but few grown. On the whole, I can not see half the crop of corn of last year, nor half th straw. The old sainfoins are a great crop; thos sown last spring are like the clovers—mostly whea and barley from the shedded corn last harvest. A great crop of hay. A more unproductive crop of cor I have not known for many years. The weather ha been all the spring and summer thus far unhealthy A general blight on all fruits; no wall fruit, and bu little other kinds of fruit. The year 1860 was a we harvest, and I did not finish carting my wheat ti October 2nd. There is a great breadth of potatoes at present not the least appearance of blight; the are selling well at 8s. a bushel. When I have made my annual inspection, and make my report, I shall be able to give you a more correct report. I expect the harvest here one month later than last year. I have seen about 1000 moons, and upwards of fourscore years, and I still see a deal of England every year, visiting, as I do, previous to harvest, so many of my old friends, staying two or three days with each of them ; they drive me about to see every improvement in their localities ; for instance, the fens of Cambridgeshire, Norfolk, &c.—the greatest improvement in all England—which, when the roads are complete, costing £300 a mile, will, in the course of time, be studded with farmhouses, with resident tenan which is so much required in most parts of Englan thereby making homes for hundreds, increasing t produce of this dependent England, and also doubli and trebling the value of the land. England is n half farmed ; with a few things, such as security tenure, &c., as I have pointed out to several M.P the produce of England might be doubled. Leases fourteen years are not sufficient ; let any man take beggared farm, it will take him seven years to resto it ; he has then only four years to himself, and the r mainder to ask himself a few questions as to a fre lease.—*Notts Guardian.*

THE IMPROVEMENT IN THE MANAGEMENT OF STRONG LAND.

BY MR JOHN SHUKER, OF [illegible]IGHTLAY HALL, CHIRBURY.

WITHIN the last twenty years every one must acknowledge that wonderful improvements have been made in the management of land. A farmer of fifty years ago would be surprised could he see much of the ground, which in his day grew little more than gorse, briars, and underwood, now converted into good tillage land ; and the stiff clays, which were almost drowned out with water, now producing fair wheat and oat crops, with occasionally a sprinkling of turnips and barley. Our meadow and pasture lands have also received a fair share of attention. The formation of agricultural societies must be regarded as the great head centre in this march of improvement. The useful subjects brought forward for discussion at their meetings, and the prizes offered for excellence in the different branches of husbandry, must have gone far to promote an enterprising spirit among men of all shades of opinions. But with all the improvements that have been made, much still remains to be done, and some of us may yet live to see production nearly doubled.

The subject of my paper—“ The improvement in the management of strong land,” I intend to treat under two heads, the first referring more particularly to permanent or landlords’ improvements ; the second to the after-management or tenants’ improvements. The first thing that strikes me as requiring attention, and, indeed, a stepping-stone to draining and all future improvements, is a good arrangement of fields and fences. In travelling through the country one cannot help feeling annoyed to find, even in these days, so many of the old style of zig-zag unsightly-looking fences. These are often 3 or 4 yards wide, inclosing fields, perhaps, of 4 or 5 acres. Many hundred acres of valuable land are thus taken up in growing this brushwood, or worse than useless hedges, only productive in maintaining a supply of rabbits, birds, and vermin ; and this class of stock we can conveniently dispense with. The manual labour on these old tortuous fences is nearly twice as much as it would be under a better arrangement. For besides the additional distance, the nooks and corners, which the plough cannot reach (in case of arable land) get overgrown with bushes, &c., and the ditches, instead of carrying the water away, are filled with stagnant water, in their hollow crooked parts, which leak into the a joining field, thereby doing much damage. The d ference in horse labour on these shapeless fields is st more apparent. A team can as easily plough ai work 1 acre in one field, as three-quarters in anothe but say the difference is only one-sixth, and this alo would give about five shillings an acre annually. this I must be understood as speaking of the mc neglected fences ; in many parts they have been mu improved ; and every one will be guided by his ov judgment what alterations it is advisable to mak But generally speaking, a good finish will be fou most satisfactory afterwards, and seven or eight sh lings an acre, taking the average of a farm, will wonders in its appearance and convenience.

In making alterations, the first consideration is t size or acreage of fields, and their position ; and, aft giving this part of my subject careful consideration, have decided to give a certain number of fields to ca farm, varying in size according to the extent of arat land. Thus, under 60 acres arable, eight fields ; 1: acres, ten fields ; and over this quantity twelve field In making a new arrangement care should be taken get the fields as far as practicable with a slope all o way, falling gradually into the hollow where the wat will most readily clear itself away with least damag Care should also be taken to make each field easy access from the homestead, so as not to pass throu one field to another if it can be avoided. If the soil variable it would be advisable to get the fields as mu of a class as possible, as this would be found mu more convenient for working and cropping. The ne thing to be done would be good and thorough drainag If it is intended to employ many hands, it is most a visable to have a man to superintend the work. H should thoroughly understand the most approved sy tem, and will see that the different parts of work a properly done. When several fields have a fall o way, and intended to be carried clear away by t same pipes, care should be taken to get the of sufficient size, and the long mains suppli with wells, air-pipes, and all modern improv ments for maintaining their efficiency. A 12-in fall should be allowed at the mouth. Before co mencing to drain a field, two or three trial holes shou be cut in different parts of it from 4 to 5 feet deep. The nature of the under soils (which I presume will be principally clay) must then be closely observed, in order to ascertain the proper depth of cutting. If at 4 feet deep, or even a little more, you get through the bed of clay into soils of a more porous or brashy nature ; or if the clay appears jointy and like to draw fairly, then I should say 4 feet deep and 10 yards apart. But if the clay runs deep and of a very stiff tenacious kind, I should recommend 3 feet deep and 7 yards apart ; although in giving this opinion I am aware I am treading on delicate ground, as few persons believe in anything but a 4 feet drain. But I think it just as rational for a surgeon to supply the same medicine for all diseases, as to drain all soils, arable and pasture, one uniform depth. The expense of both systems is very much alike, viz., when 7 yards apart there will be about 106 rods to the acre, and this at 6d. per rod amounts to £2, 13s., cost of the pipes, including a share to mains, £2, 12s. 6d., making £5, 5s. 6d. The 4 feet cutting 10 yards apart would be about 87 rods at 9d., £3, 5s. 3d., pipes £2, 4s. 2d., making £5, 9s. 5d. In the former case the extra cost of pipes is more than counterbalanced by the greater amount of labour in the latter. This does not include the hauling of the pipes, and to this or almost any other class of drainage, should be added, superintendence, 7s. 6d., pipe laying, 6d., emps, &c., say 3s. 6d., making an average total of something like £6, 4s. an acre.

In the case of meadow and pasture land, many of you I think will agree with me, that the drainage, as a whole, has not been attended with such beneficial results as had been anticipated. No doubt a deal of this has been owing to a want of proper manure to encourage the growth of the fine grasses ; but some has probably been over-drained. With the exception of some extreme cases, 11 or 12 yards wide, and 4 feet deep, will be found sufficient for the stiffest soils. The drains should be laid out in a slanting direction, as much as the fall will allow, as they have thus a much better chance of taking the water. Main drains should always be run as straight as possible, and when going through or near to fences, I should strongly recommend the use of socket pipes, joined together with Roman cement, to prevent roots, &c., getting through into the pipes. All ash, willow, alder, and wych elm should be grubbed up within several yards of the drains. There should be as few mouths or emps as possible, and these at a point (as far as the field will admit) where the water will most readily clear itself away. The last pipe should be a cast iron one, fitted with a swing gate. Instead of the plain fronts usually made, I should suggest the following plan, which I think a great improvement. Say a flagstone under the mouth of the pipe to prevent the ground wearing away ; form a recess in the masonry for the pipe, arched over so that it cannot get damaged. In the back part of the work common bricks may be used, but the front should be done with second quality fire bricks, and cement instead of mortar. This is said to stand one hundred years, and the whole system, if properly done, will repay the few shillings an acre additional expense for superintendence, &c., an hundred fold.

And now we come to the second part of my subject —the cultivation or general management of strong land. In this part I am afraid I shall fall short in supplying any system of working the land that will compare at all favourably with the free easy-going process of the light land farmer. From the hard stubborn nature of the stiff clays of which I am speaking, they certainly require a great amount of horse labour to sufficiently pulverise the soil, and secure a proper tilth for the reception of seed, &c. And I am strongly of opinion that the proper working of strong land, when the soil is dry, is really of more advantage than manure. As a rule, four days a-week is as much as a strong land farmer can successfully work his land; and for this reason it is necessary he should keep a good strength of horses, so as to make the best possible use of all favourable weather. The all-powerful steam-engine is the power required to assist the strong land farmer in smashing up and pulverizing with heavy implements our stiff clays when the weather is favourable, thus reducing the number of horses, and leaving them only the lighter kinds of work. But I regret to see, from the Royal Society's Report of last year, and other reliable sources, that, on the whole, steam applied to the cultivation of land has not produced so good results as could be wished for. Still, when in good hands, it is spoken of very satisfactorily ; and I feel sure, in a few years it will be so far improved and simplified as to come within our reach. A few months ago I saw an account of a new, and, certainly to me, a novel application of steam, just patented by a M Gibbs, of Essex. He professes, in addition to cultivating his land with his tackle, to use the engine i harvest time for making hay and seasoning grain in dependent of the weather, and hoisting it up on th stack. One would think after this there was littl more to desire ; but some will probably prefer waitin to see it a little more in practice before purchasing Before going through the yearly horse-work, I ma mention that a good collection of implements is a grea advantage in working clayey land. The rolls, har rows, cultivators, &c., should be of the most im proved make, strong, and likely to deal successfull with rough work. The ploughs, in particular, shoul be those which cut a high-crested or pointed furrow being far better for working than a flat swampy one I shall now assume that a team can at once take th full length of the field, instead of being kept the whol of the first day ploughing a corner or two of sho ground, which should properly be done in two three hours. The land has been drained, too, an the pipes are carrying away some thousand gallons water, which was formerly floating about the surface saturating still worse the already stiff land. By thi means, after heavy rains the land will bear workin a day sooner than otherwise ; besides, the water no works through the soil into the drains, thus leavin all manurial sediment in the land, instead of, as before running down the open furrows, carrying away n only much of the natural soil, but also manure latel applied to the land. For the improvement in fence and draining, the rent will probably be increased 7 or 8s. an acre. This certainly looks a good deal, bu if the drains act fairly it ought to pay in workmanshi alone after the first year or two. I confess, howeve through the blending up of the soil and the carting pipes, which is often done in winter time when th land is wet, more injury than benefit is the result the fir season or two. Landlords, I think, would do well consider this ; and if they would allow a season blow over before charging per-centage, it would be means of bringing draining more in favour wit tenants, who often cry it down before it has had fair chance of shewing itself. Of the improved fence there can be but one opinion ; no sensible man woul object to pay an extra sixpence an acre for well-a ranged fields and straight fences in place of the ol ones, which, although an ornament to parks an pleasure grounds, are much out of place on cultivate farms.

I will now just notice the course of working a strong land farm for twelve months, but, in the space left, my remarks must necessarily be short and imperfect. In the first place, allow me to mention the difference I have observed in the management of labour. Some farmers will do as much work with seven horses and eight men as others with nine horses and ten men, and in this way greatly economise labour. The course of cropping I should suggest for the poorest soils, which are considered too stiff and cold for growing any root crops, will be the following—eight, ten, or twelve rotations—which I shall suppose are the number of fields. Rotation for eight years: First, fallow, dunged; 2, wheat; 3, peas or tares; 4, oats; 5, beans, dunged; 6, wheat; 7, clover, limed; 8, pasture. Rotation for ten years: First fallow, dunged; 2, wheat; 3, peas or tares; 4, oats; 5, seeds, limed; 6, pasture; 7. pasture; 8, oats; 9, beans, dunged; 10, wheat, Rotation for twelve years: First, fallow, dunged; 2, wheat; 3, peas or tares; 4, oats; 5, seeds, limed; 6, pasture, to be ploughed up about July or August, and well worked; for 7, wheat; 8, beans; 9, wheat; 10, oats; 11, seeds, limed; 12, pasture. In each of these cases we should get more than half the land in grain crops. The courses, however, are well varied, and the land derives the advantage of rest in pasturage, which refreshes it more effectually and durably than any course of manuring.

In these rotations I have just kept in view the convenience of working, of which I shall speak more fully hereafter. Starting, then, with the yearly horse labour, I will first take the field intended for fallow. This would be better if ploughed in September, but I am afraid time will not allow till after wheat sowing is completed. It should then be ploughed 6 or 7 inches deep by 9 inches wide, in broad planks or lands, in order to have it all stirred over. This work, with threshing, carrying away the grain, and carting prepared manure to meadow and pasture land, if the weather suits, with other incidentals, will probably occupy the time up to Christmas.

After Christmas, if the land is sufficiently dry, proceed with the ploughing for spring crops. This, also, as far as horse labour is concerned, is the most convenient season to draw lime for the seeds, which should be spread about April or the first week in May. A fresh supply of manure for the meadows should now be prepared by collecting road scrapings, mud from pools and ditches, and any other marly substances at hand, to be mixed up with barn-door and stack-yard cleanings, as far as it goes, then lime direct from the kilns thrown over all the heaps at the rate of a ton to 8 or 10 loads of marl. This should be at once turned and mixed together; and this turning should be repeated two or three times, at intervals, in order to get a well-made compost. Peas should be sown the last week in March, and oats directly afterwards. For both crops the land should be cultivated and well worked, and if seeded down with oats a good fine soil must be made. After the oats are properly harrowed in, the land should be heavily rolled to get a firm seed bed. The seeds, after being well mixed, should be sown with a broadcast machine, and the land lightly harrowed, and again rolled. The following will be found a proper mixture of seeds for two or three years' pasture:—1 bushel rye-grass, 6 lb. red clover, 4 lb. white clover, 2 lb. catstail, 2 lb. crested dogstail.

The horse-work is now drawing within a narrow compass, the one fallow field being all there is to attend to. First cross-plough, then harrow, roll, and cultivate repeatedly, to bring all twitch and weeds to the surface. This field should be thoroughly cleansed,
as there will not be an equal chance again for sev
years. It is seldom necessary to gather twitch
weeds off a summer fallow, as the long days and
sun are pretty sure to prevent anything growing aga
and they are probably some benefit to the land. W
well worked, cast on the manure, and cross-ploug
in, to stand till it is time to plough it for wheat.

If there is a ley to be broken up and worked
wheat, this should be done in August, and the hor
should be kept regularly in work during harvest, so
to be ready for getting out the manure for beans sho
after the ground is cleared. These should be put
during the last week of September, drilled 12 inc
apart, with 5 or 6 quarts of tares per acre. Th
should be well cleaned by hoeing in spring. T
wheat land will probably require to be ploughed
9 feet ridges or butts, and drilled with a sevent
spout drill, or else sown broadcast, according to the st
of the land, and worked up with harrows 10 feet w
four to the set. The middle of October is time enou
to begin wheat sowing, but most of the land should
ploughed ready. If the drains work fairly, the rea
will not require opening with the plough; but furro
should be drawn round the lower headland and a
hollow places of the field, and these must be at or
cleaned out with the spade to take away all surplus wat

On the better class of strong land, likely to pay
ploughing, I should suggest the following courses:
Rotation of eight years. 1st, wheat; 2d, turni
3d, barley; 4th, seeds; 5th, oats; 6th, beans; 7
wheat; 8th, seeds. Rotation of ten years: 1
wheat; 2d, peas or tares; 3d, oats; 4th, seeds; 5
wheat; 6th, turnips; 7th, barley; 8th, seeds; 9
oats; 10th, beans. Rotation of twelve years: 1
wheat; 2d, peas or tares; 3d, oats; 4th seeds; 5
wheat; 6th, turnips; 7th, barley; 8th, seeds; 9
oats; 10th, beans; 11th, wheat; 12th, seeds. T
crops in these rotations are varied, and the horse-wo
conveniently divided between spring and autum
with proper manure, these courses should be succes
ful. For one year's seeds the following mixture w
be generally found sufficient. One bushel rye-gras
10 lb. red clover, 4 lbs. white clover, 2 lb. alsike
In this rotation the turnip crop will require much
tention so as to get the soil well worked. T
better plan, on this land, is to finish working and so
a little at a time, in preference to getting the whole fie
ready first. The crop should be cleared off in Nove
ber, if the weather is at all favourable, or afterwards wh
the land is tolerably dry. It will greatly injure t
field for coming crops if they are carted in very w
weather. It should be ploughed as soon as circu
stances will permit, in order to get the benefit
spring frosts; this being a wonderful assistance
procuring a fine tilth for the barley crop and seed
The meadow and pasture land, after draining, will
found more sound and much better and safer f
carrying sheep. But to bring about much real im
provement in quantity, or even quality of grass, it wi
require further assistance in the shape of manur
Farm-yard dung, carted about December, and we
worked in spring, will be found most beneficial; b
this probably could not be spared in large quantiti
from the rest of the farm. Raw or boiled ½-inc
bones have produced most satisfactory effects in im
proving the herbage after draining on this class
land. The boiled bones act quicker, and for th
reason would probably be preferred. About
or 7 cwt. per acre put on about April, chai
harrowed and rolled, would be a fair dressin
and produce good and lasting results. 3 or
cwt. of boiled bones and 1½ cwt. of nitra

of soda will produce good and early keep. I have mentioned before a mixture of marl and lime, or marl and dung, as making up a good compost for pasture land. This should be chain harrowed in spring with a few of the finer grass seeds. I again recommend everything likely to form manure, when properly mixed, to be carted to the heap. This can be done in frosty weather and odd times, when neither men nor horses are very valuable. In this way alone several acres can be manured annually without any great expense; sufficient, in fact, to keep the meadow land in fair condition. It will be seen, that in my rotation of crops, there is, in all cases, more than half the arable land in grain crops, in some cases two-thirds. I think it quite within my province to remind you that good manure is essentially necessary to strong land farming. With so much of the land under grain, and so little under turnips and green crops, it is impossible to make good manure from the straw alone. The produce from the extra acreage should be converted into food for the stock on the farm—part in its natural state, and part exchanged for cake, bran, and other feeding stuffs—to be mixed with cut straw, bean, haulm, &c. This will be found to improve the stock, as well as manure, and ultimately lead to more successful farming.

ON THE BREEDING, FEEDING, AND THE GENERAL MANAGEMENT OF THE PIG.

THE old proverb, "Give a dog a bad name, and you may hang him," is very aptly illustrated in the case of the pig. On account of the generally supposed dirty habits of pigs, they are held in low estimation in many parts of Great Britain, and yet if we give them a fair field and no favour, but remember at the same time, no injustice, they will be found to come out of the testing ordeal in a much more creditable manner than we will be inclined, at present, to allow. In short, the false accusation of dirty habits, which is attributed to pigs, is entirely wrong, and the accusation really applies more to their owners who keep them dirty, than to the animals themselves. When constrained to be amongst dirt, and eat food only fit for the dunghill, and dealt out with a grudging hand, how can they exhibit other than dirty propensities? But let them have room, choice of clean litter, and plenty of food, and they will soon be seen to keep their litter clean. Place their droppings in one corner of the court, and preserve their bodies in a wholesome condition. Therefore, in making the following remarks upon pigs, the subject of pigsties deserves the first consideration.

As the pig is a very tender animal, it is highly necessary, in order to grow and thrive well, that they should be kept in a warm place in winter, and, on the other hand, in as cool a place as possible during the hot weather, especially if they are very fat. The best sort of sty we would recommend is one in which they can be fed in the house of the sty, under a good waterproof roof, which should be supplied with clean dry straw for their bed. When the straw gets short, turn it outside in the yard of the sty, where short litter is more suitable than long, and then fresh straw inside for their bed. If managed in this way they will leave their dung and water outside, which is the proper place; whereas pigs fed outside oftentimes deposit their manure inside, thereby making their bed damp and uncomfortable. The vapour arising from the manure (which, perhaps, may be close to the pig's nose) makes the air impure, and is injurious to the health and appetite of the pig.

Many people prefer to have the whole of the sty under roof, and, if it were necessary, to allow the animals to have a run out of the house, to loose them in the large yard, putting them in at night and in wet weather. This is found in many places to be a very good plan, producing good manure, and tending to the greater cleanliness of the pigs; but a considerable amount of care requires to be taken lest they stray away too far, and if the yard of the sty is reasonably large, perhaps it would be better, on the whole, to let them remain there. There are three kinds of piggeries or pigsties suited for the various conditions of the animals.

1st, Those for a brood sow, with a litter of young pigs. This kind should have two apartments: one for the sow and litter to sleep in, covered with a roof, and entered by an opening, the other an open court in which they run about. For a breeding stye each apartment should not be less than 6 feet square.

2d, Those for feeding pigs, the number and style of apartments being similar to the first case. A sty of 4 feet square in each apartment will accommodate two feeding pigs of 20 stone each.

3d, The third kind of sty is for the accommodation of weaned young pigs when they are confined, to receive better treatment than the older ones. It should have a shed or court of from 20 to 25 feet square.

Again, in selecting pigs for sows or stock, the coarsest large-framed old sows should be chosen, and one for a boar, from a fine-skinned good-bred sow, o *vice versa*, fine-bred sows and a coarse hog; a fine hog and coarse sows are perhaps preferable, but they should be from old sows to keep for stock, and by getting a good cross the pigs will grow faster, thrive better, are much more handsome, and will gain more weight in less time when fattening than a thorough bred, and when fat will command a higher price in market than a thorough coarse-bred pig or a thorough fine-bred pig; for a coarse-bred pig does not get so handsome, and a fine-bred pig makes too much fa according to its flesh. In the third place, a boar should not be allowed to run with sows, and sows should be twelve months old before put to profit, and a boar should be twelve months old before allowed with sows; if allowed before they attain that age the stock is weakened, their growth stopped, and they never afterwards get such strong and healthy pigs as they do if kept till they are that age. A sow ought not to go to the same hog more than twice, and a sow ought not to be put to the hog until she is well on hogging. Let him serve her well once, and no more, and then shut the sow up where she can t for a day or two, before letting her amongst ows, and, by keeping account, the day when l pig can be reckoned. Shortly before she pigs, ie sort of food which she will be fed with whilst g her pigs should be given her. By so doing, v is got into the habit of coming in when she is l, and likewise get her used to the food, as mes a sudden change of food brings on milk or other complaints to which sows are subject times, or upset the stomach of the sow, thereby the milk to upset the stomach of the pigs, brings on scouring, stopping their growth, and g their health, thereby making them weak at ie they most want it to strengthen them. The ould be let out of the sty for a run two or three fter pigging, and the pigs also, when a week or d, in fine weather, and not too cold for them, they will enjoy, and they will grow faster, and re healthy, than if kept shut up, and a good, dry bed must be particularly attended to; e must be taken not to allow the sow too much o make her bed when about pigging. By hav- much they often smother some of their pigs. ow has more pigs than dills, take the weakest ier, and leave her as many pigs as there are It is a good plan to have two sows, pig down, together, then if one has too many, and the iot enough, you can shift them, and so have two tters. Pigs should be cut in warm weather, ix weeks old; in cold weather, seven weeks, ien well wean them; and the sow should be ell till taking the hog. When the sow is quite m milk, let the pigs run the yard, feeding them g and night with good and nourishing food; h sow's pigs should be fed separately, and lie e from others, when stores and when fattening. rd to the feeding of pigs, it is generally thought o give them their food cooked, instead of raw, from the fact, that the stomachs of pigs are very much like human stomachs, both very prone to become acid, and it is also well to put in a little charcoal as a palliative. They should be fed regularly, then they do not expect anything before their feeding time comes. Seven o'clock in the morning and five in the afternoon, are good times to feed sows with pigs and stores, but fatting pigs should be fed three times a-day. It is found an excellent system in feeding pigs to give them soft food for breakfast, then a shovelful of charcoal, soft food for dinner, and peas for supper. A small tub with clean water is particularly required.

The following remarks from Arthur Young relative to the breeding and feeding of swine are worthy of the attention of every farmer. He says, "The farmer who could make a considerable profit by hogs must determine to keep a proper number of sows, in order to have many pigs; but this resolution ought to be preceded by the most careful determination to prepare crops proper for supporting this stock. The proper ones for that purpose are barley, buckwheat, beans, peas, clover, potatoes, and carrots. Potatoes, carrots, swedish turnips, and cabbages must be provided for the sows and stores, from October until the end of May, by which time clover and chicory would be ready to receive them, which will carry them till the stubbles are cleared, so that the whole year is filled up with these plants, and the common offal of the barn-door and of the corn-fields. When the sows pig, meal must be provided to make a wash by mixing it with water. This, in summer, will be good enough for their support, and in winter it must be mixed with boiled roots, oats, and pea-soup for the young pigs. Upon this system a farmer may apportion his swine to his crops, or his crops to his swine, and he will find that for a whole year he should have about an equal quantity of roots and grass, and half as much corn as potatoes.

THE INSECTS OF THE FARM.

BY PROFESSOR BUCKMAN.

[Read before the Maidstone Farmers' Club.]

the first glance this subject may appear somewhat circumscribed, but upon a little considera- will be seen that it is a subject of very wide

If a single crop, like wheat, be taken, it will d subject to attack by insects of various kinds ie first moment it is put into the ground till the pened; indeed, insects would attack it in the in the granary, and even when it is converted our. One of the erroneous impressions that ntertained with regard to insects was, that hard s were prejudicial to insect life. Nothing could be er mistake. It was customary, when there came summer after a severe winter, for people to say stonishing it was that there should be so many

ARD WINTER IS A PRESERVER OF INSECTS,

something is done to destroy them, while a vinter exposed them to the attacks of their s. The insects which attacked our corn were of our country, and seemed to know, when they assumed their caterpillar state, and had to provide for the winter, what sort of winter was going to happen, and they went into the ground a greater or less depth, according to circumstances. If we had a hard winter the insects were bound up by the frost, or covered up by the snow for six or eight weeks at a time, and the starlings, and rooks, and plovers, their natural enemies, were starving by hundreds. It was quite true that when the weather became more mild the birds would eat more for the time, and so destroy a larger number, but they never made up for the lost time.

WINTER PLOUGHING BEST METHOD FOR KEEPING UNDER INSECT LIFE.

One of the best and readiest methods for keeping under insect life was winter ploughing. This enabled the birds to get at the grubs, exposing the insects, and admitting the frost. Another excellent plan was to put the manure on the land previous to the winter ploughing, or as soon as the corn was in the rick. If the manure should be in the green state, it left the land much more hollow, and therefore much more open to the action of rain and damp, which was much more prejudicial to insect life than even frost and cold, and at the same time the insects were much more exposed to the birds. As to the question of birds with regard to insects, he would venture to say a few words on the vexed question.

WHETHER BIRDS DO GOOD TO A FARM OR DO MISCHIEF.

From the conclusion which he had arrived at, he was quite convinced that there were some birds which principally did good. It was true that the rook and starling might occasionally do a little harm to crops in the field, and thrush and blackbird in the garden, but they also did a great deal of good. He had shot rooks under almost all circumstances, in order to ascertain this fact. Even when he had caught them in the act of stealing corn, while he had found some corn in the crop and in the gizzard, he had never found them without those grubs that had been so prominent in their attacks upon the crops. There was, for instance, the larvæ of the moth, which would destroy any root crop in an incredibly short space of time if it were not for the rooks. Therefore, with regard to the rooks, he adopted the plan of keeping everything as quiet as he could, in order that they should not be disturbed in their search for food of this kind.

INSECT BLIGHTS.

He must call their attention more especially to the insects which came under the term of blight. They should be hearing more of the blight, perhaps, in a few days. It was conceived by some that these insect blights came from some distant country, but there was every reason to believe that their ordinary blights were produced by insects brought up round about them. They migrated, it was true, from one field to another, and perhaps from one parish to another, but their migration was not very extensive, and, as a rule, they came no very great distances. One great difficulty in coping with them was their minuteness. They were so small that few could discern what they were about with the naked eye, and they were considered by some to be after all very pigmy enemies. From their multitudes, however, they did more mischief than larger creatures could possibly do. Professor Buckman then drew attention to

THREE FORMS OF INSECTS WHICH ATTACK WHEAT.

There were the beetles, the flies (two and four winged), and the moths. Taking first the beetles, which were known by their horny wings, he said the common cockchafer which was so abundant now in France, was a large creature, and it could be seen what it was doing. Their larvæ was most mischievous, and this was not surprising when they found four generations of this insect in the ground at once. He had known people pay 3d. a quart for collecting these insects, and they had made pretty good wages. They were omnivorous, and attacked almost anything. The larvæ would eat the wheat below the ground. It was an insect of the most mischievous character. The ordinary beetles had also a larvæ state, and it was in this state that they did much mischief. Many of them would eat vegetables. In the perfect state many of them did little harm. There was one that ate the pea lobes, and would be found very general in almost every part of the country—the little weevil. He had had a crop of peas entirely destroyed by it, but he attributed it very much to the carelessness of the gardener; because they could easily manage them by a little soot sprinkled over them on a damp morning. The cockchafer, too, was not only mischievous in its larvæ state, but in its maturity it would strip whole trees; and nothing seemed to come amiss to it, although it had a preference for the softer kinds of leaves. In this country we had not such a number as to do much injury to our corn fields, but on the Continent they destroyed a wheat crop just as readily as a mass of locusts would do. It was on this account that our Continental neighbours were so anxious to import birds to eat the larvæ; and he believed that, if possible, rookeries would be established in France in a few years' time to a greater extent than they had ever been known. They knew when the rook was doing mischief, and they could easily appoint people to prevent them, but he viewed them of as much importance as farm labourers; but, like the labourers they required looking after, for the best of them would be doing mischief occasionally, if they were not checked.

WIREWORM LARVÆ OF CLICK BEETLES.

The wireworm was the larvæ of a beetle called the click beetle, from its making a peculiar noise. They all knew of the ravages of the wireworm, and how, on going over their farms, they would find stalks looking yellow, which would break off, leaving the roots only Farmers sometimes imagined that this appearance was occasioned by birds taking the seed wheat away from the sprouting corn; but this was a fallacy. The only remedies to keep these insects down were those he had alluded to—winter ploughing, so that the birds could get at the eggs. The little wagtail would destroy thousands. He also found rolling a great advantage as the plant would then frequently send forth new roots, and start more vigorously. A little topdressing with manure was also oftentimes a great advantage The beetles laid their eggs in the stubble towards the end of the season, and if these stubbles were dressed with manure and then turned up with the plough they would all be exposed to the birds, and in that way he knew from experience a very great number of them got destroyed. The flies which attack the wheat crop were then glanced at, especially the saw fly, the larva of which ate away the stem, which fell down as if i were over-weighted.

WHEAT MIDGES.

Amongst the four-winged flies there were perhaps none more destructive than the wheat midges. They were not much larger than a gnat. It produced, as they all knew, a little worm, and it was perhaps one o the smallest larvæ with which they had to deal. Its whole life seemed to be devoted to eating out the pistils of the wheat, without which the seeding could no take place; and when these insects were abundant they might be sure they would have a small quantity of corn. There was another wheat midge which attacked the leaves and the stems of the plants, and of course when the leaves, which were the lungs o the plant, were destroyed, it was never perfected. A similar insect to this, though of a brown colour, was very mischievous in America. It would be found in the rick, and great numbers would be found in the refuse after thrashing and sifting the corn. The refuse should be burnt to get rid of the insect. The smu in wheat was a vegetable blight produced by a smal fungus; and there were the effects of another form o insect life, which was taken for this. It was a minute kind of worm which was known as angula, from it appearance to a minute snake. He had now brought before them the principal kind of insects from which their crops were liable to be attacked. After all, it was in their grub state that they did the most mischief, when they were just beneath the ground.

CONCLUSION.

There was no remedy better, where the roots of the wheat had been at all disturbed by insects, than the implement he had mentioned ; and he preferred a combination of the Crosskill and the Cambridge roller, which well pulverised the soil, and re-planted the roots which had been disturbed. A great number of the creatures, too, were crushed and killed by the process. He was quite convinced, too, that whenever dung was used, it was never thoroughly digestible by the plants until it was fully incorporated with the soil ; but not only did they accomplish this. They must remember that there was no more fruitful source of presenting our plants with insects than in carrying them in the manure, as it was also the fruitful source of weeds. Birds did a great deal of mischief in some senses ; but they were appointed by nature for the purpose of keeping down insect life which, but for them, would increase to an extraordinary extent ; and, with regard to insectivorous birds, they ought to be extremely cautious how they permitted their destruction. It necessitated the study of the natural history of those creatures, so that they might know when to take them or leave them alone. He also thought that a farmer's education should not be considered as complete until he knew something of the numerous insects by which he was surrounded.

At the conclusion of the lecture in reply to so observations and questions put by gentlemen prese

Professor BUCKMAN said, with regard to the wi worm, if his own crop had been attacked by it in way he did not admire, he gave it a good rolling ; b if that did not have the desired effect, he had it hoe which completely baffled the wireworm, for as soon the ground was hoed they were exposed to the bird The weevil did attack the beans, but not so much as did peas ; and if they were to approach the ro cautiously, they would see them fall down, and being picked up they would not move a limb, b feigned death remarkably well ; and in that way, supposed, they often escaped being killed by the bird The best plan for their extirpation, he found, was take some powder or dust of any kind, and throw ov the plants when the dew was on them. If th bothered them, and moved the soil about continuall the insects would soon move off. They did not li long, but deposited their eggs, and then died off the winter, but some few of them might happen live through. Each female laid about 150 egg and if their enemies did not destroy them, there wou be a great quantity of them. He, then, in answer one of the previous questions, said that in cold st soil there was a large number of insects. He fou that higher farming was more liable to have a larg amount of attacks ; but, with the higher knowled of farming, there ought also to be a higher knowled of insect life. The caterpillars in the white-tho hedges were not those that had affected their cro but kept to the hedges, and sometimes ate them much that they did not recover it for five or six year

Papers by Tim Bunker.

[These papers, which have become deservedly popular with our transatlantic farmers, appeared originally in the columns of a well-known monthly journal, the *American Agriculturist*. They contain a great amount of worldly wisdom, and considerable information on farming and gardening, conveyed in humorous but sensible language. It is our intention to reproduce in this journal some of the best papers, slightly altering and condensing where necessary, to adapt them for readers in this country.]

NO. I.—A STROKE OF ECONOMY.

THE farm is a good school of economy in many respects. The age of homespun is yet fresh in the memory of many of the living, and its close calculations are yet visible on many a homestead. Time was less valuable in that age than in this, and money far less valuable now than then. But multitudes have not yet waked up to the fact, and often spend several pounds' worth of time to purchase what is not worth 50 pence at the market price. When every proprietor's time is worth a pound a-day in the legitimate business of planning and directing the labour on his own farm, he is in poor business, doing work which another will do for him at one-quarter of the price.

We have already begun to divide the labour of the farm, and have reaped very great advantage from it, and this division can be carried to a still greater extent with profit. The horse and the cultivator do a great deal of work once done by the hoe and human hands. No wise man will use the latter when he can avail himself of the former. The mowing machine is doing the work of a dozen men every fine hay day of July. How long will shrewd calculators break their backs over the old-fashioned scythe? Is it not about time to upset the old stumps, and put powder into the rocks that have been ploughed, harrowed, hoed, and mowed around for six generations? They have had their day, like other dogs, and should now be bidden to "get out." Labour is no longer the only or the cheapest equivalent for the farmer's wants. The question ought to be asked, how can this or that want of the farmer be met in the cheapest way? If a man wants information in regard to husbandry, he can get the best thoughts of our best cultivators at a much cheaper rate in the columns of our agricultural journals, than by visiting his neighbours to ask questions and make observations.

But Tim Bunker never thought of that. He has not much opinion of "that 'ere book farming." But Tim observes, and is quick at calculating an idea that he sees growing right out of the sod. "Them is the sort of ideas for practical farmers." He does not take the papers, but Deacon Smith, across the way does, and offers to lend them, but Tim is so wall-eyed on the papers that he never accepts the offer. But he sees the Deacon's strawberries, and wonders if they would not grow in his soil. He plants, and succeeds. The Deacon sells, in the next market-town a quart of strawberries for as much as he used to get for a bushel of apples. Tim thinks his strawberries look as good as the Deacon's, and he goes to market and brings home the cash. "In fact," soliloquises Mr Bunker, "this business pays, and if folks will buy the strawberries at that price, I may as well raise them." The strawberry patch was realized last year, and a handsome sum o money with it. One of the coldest days last week Tim drove up to our door, after a long ride, which must have been tedious even with the excitement of fine sleighing and the music of the bells. Now, thought we, Bunker has certainly come to invest in book-farming Not a bit of it. He had heard of a new variety of swede turnip, and had come down to find out where the seed could be purchased. We were, of course, glad to see Mr Bunker, and gave him a disserta tion on the variety, relating our experience and mode of culture, and giving him the necessary directions for procuring the seed. Had he taken an agricultural paper [such as *The Farmer*], he would have found in it much more information than we had time to give him, and in the last number, no less than four parties advertising the seed for sale. Mr Bunker's account stands thus with himself:—

TIMOTHY BUNKER, *Dr.*

		s.	*d.*
To time and use of horse	.	10	0
By information in paper	.	0	4
Balance	. .	9	8

This is what we call a bold stroke of economy. Yet this account, foolish as it looks, is a good illustration of what is going on in many of the farming districts. Intelligent men will give ten shillings to save fourpence in paper and type. We think they will do better to take the papers, and buy their information at wholesale price. Our time, however, was not lost with Mr Bunker; for this article came of his visit, and we trust it will touch some of our readers in the right spot. —ED.

NO. II.—ORNAMENTAL TREES.

Tim Bunker says he would give twenty pounds in clean cash if he had the Deacon's big elm tree in front of his house. It is a noble elm, planted a hundred years ago by the Deacon's grandfather, also a Deacon in the same church, when the sanctuary, with its square pews, high galleries, and sounding-board, was the type of all ornament tolerated in things sacred or secular. But the first Deacon loved shade and meditation, if he failed to appreciate the beautiful in trees, and so planted this elm and the row of maples that adorn the street. The elm now is a very majestic object, and probably no one passes under the shadow of its wide-spreading branches, and looks up into its leafy arches in summer, without admiring it and blessing the memory of its planter. The offer of so conservative a man as Mr Bunker, is a good indication of its value. Even he would shell out the cash if he could rear such a noble creation in a day, in front of his dwelling.

A good many of his neighbours would give half as much for such an elm, but for some strange reason neither Mr Bunker nor his neighbours plant ornamental trees, thou they are plenty enough in the forests, and t nurseries have them in great variety for mere trifle. It does not occur to them th time will make of the humblest sapling lordly a tree and as graceful in its prop tions as the big elm.

They have only to plant it in good so and guard it against injury, and nature w do the rest without compensation. Eve year will add to its gracefulness, and to t value of the homestead which it ador The time has come when farmers shou think more of planting ornamental trees a matter of economy. They can be plant at the roadside with little disadvantage to t adjacent land, and will soon turn an unint resting road into a graceful, shaded avenue, the summer. It should be a part of the settl policy of every farmer to adorn all the roa leading through his farm in this manner. If continues in possession, these trees will be o jects of interest to make his home attracti as long as he lives. Let the good work commenced this month.

NO. III.—TIMOTHY BUNKER, ESQ.

This gentleman of the old school, who name gives the title to these papers, is sure create some interest, so we here give a bri sketch of his career. He now holds t office of justice of the peace, though was so late in arriving at this honou that everybody calls him Tim Bunker, ju as they used to. He himself blushes the title, and perhaps feels insulted if a of his old neighbours call him anythi else. It is said, however, that his wife, speaking of the husband of her youth to thi persons, does sometimes give him the honou but she is very careful never to call him Es Bunker in his presence.

He was born and bred in Hookertown, a is a product of its soil and institutions, unique that it were impossible for Ti Bunker to have grown up anywhere els He would have been quite another ma He lives in Hookertown, in the first eccle astical society, and all his ancestors for fi generations back have been members of t Church of the standing order in that a tient town. He is not himself a me ber of the Church, but his orthodoxy is vigorous and sturdy as the most devo member of the Presbyterian church where worships. He reveres the institutions religion, and is as punctual at the meeti house on the Sabbath, as the preacher or the sexton. His model man is Deacon Smith, though he follows him afar off, both in horticulture and in religion. He is as zealous as the deacon in the defence of the speculative doctrines of the Church, and is quite as correct in his moral deportment. By all but his intimate friends he is supposed to be a member, so correct is he in his opinions and practices. His personal appearance is somewhat striking. He is just about medium size, square built and stout, and though past fifty, can keep up with the smartest of his hands in the field at any kind of work. He has an open, manly face, expressive of benevolence, and his look does not belie his character. He is known far and near as an excellent neighbour, always ready to help at a bad job, to change work, to lend his horse or oxen, even when it is not quite convenient for himself. In dress he is always behind the times. The Sunday hat has been his for five years, and neither rim nor crown has changed with the changing fashions. His dress is of the same age, and the only trouble pertaining to dress that agitates him is the apprehension that his habiliments will sometimes wear out in spite of his scrupulous care. A change of suit always goes hard with him, and it requires the most adroit management of his good wife to get him safely out of the old into the new. He has been in a condition which she calls "not fit to be seen" for a full year, before she can effect a change of Sunday suit.

In politics Tim Bunker was a whig until the last general election, since which time parties have become so much split up, that for once he has found himself entirely at a loss. For his part, he cannot see why folks want to keep changing about so, every few years. If the world ever gets finished and adjusted to a given position, he will be a supremely happy man.

He has always lived upon the ancestral farm, and by a life of industry has succeeded in buying out the other heirs, and now owns in fee simple all the paternal acres. He is a good sample of the old style farmer, shy of books and papers that treat of husbandry, and a frequent quoter of that old proverb "old birds are not to be caught with chaff." Tim, however, was once caught, if not with chaff, at least with something very like it.

Some five and twenty years ago, there was a Rohan potato fever that infected all Hookertown. Many of his neighbours who read the papers experimented with the article, and among the rest his model man Deacon Smith went into the speculation. Tim Bunker believed in practical farming, and as these potatoes were manifestly a reality, he bought of the Deacon a bushel of Rohans for forty shillings. This was pretty warm in the mouth, but as some sold for fifty the same season, he was satisfied with his bargain. It was the last year of the speculation, and the fall crop was dull in the market, at four shillings a bushel. Tim Bunker rubbed his eyes with both his fore-fingers, when harvest came, and declared that he would never touch another new thing. But he has repented of that now, and adopted quite a number of new things that have been tested in the Deacon's garden. He is always certain to make the Deacon pay for his own experiments, and only adopts the new fruit or vegetable when he is certain it will pay. He has lately got wind of the Dioscorea Batatas. His neighbour lent him the nursery pamphlet in which the wonderful productiveness of that astonishing tuber was duly set forth. Tim digested its contents, and when he returned the pamphlet, very dryly inquired—"Deacon, does not this make you think of the Rohan?" He will not purchase this year.

Conservative as he is, there is manifest progress with Mr Bunker, and a real improvement is sure to find its way, in due time, to his farm. The debit and credit account of his adventure in pursuit of the new turnip struck Tim full in the face. He has not stopped thinking of it yet, and we hope to record his name, before a great while, upon our list of subscribers.

NO. IV.—TIM BUNKER'S VIEW OF THE BIRD LAW.

Jeremiah Sparrowgrass left Hookertown for the commercial metropolis at the tender age of sixteen, thinking that his salvation would be effected and his fortune made for ever, if he could find a situation as clerk in a draper's shop. He found in the city the object of his lofty ambition, and, after a little roughing it, was duly installed as errand boy and professor of small jobs in a respectable establishment At the age of twenty-one Jeremiah is a clerk with a salary in the establishment where he commenced his mercantile life; a youth of promise in the esteem of his friends, and not slow in his own estimation. In May he took it into his head to visit his country cousins at Hookertown, and to regale himself a little with country sports.

Nothing seemed better adapted to his tastes than gunning, and he accordingly brought up from the city a fowling-piece, that he might carry out his deadly intent. He had seen certain brave, chivalrous youths returning from the country, dressed with hunting cap and coat, and ornamented with powder-flask, shot-bag, and game pouch, the very pictures of genteel recreation. So the first morning after he had surprised Hookerton with his advent, he girded on his shooting toggery and military weaponry, determined to make the birds of his native parish smell gunpowder, and bite the dust. He had some obscure recollections that there was a prejudice against birds among the farmers on account of their pulling up corn, and thought he would be performing a very good deed, as well as exhibiting his own prowess, by destroying them. His whole memory of country life had become exceedingly impaired by his city residence, and he delighted to shew his ignorance by asking questions upon topics that he was thoroughly instructed in when a boy of ten on the farm.

Passing Deacon Smith's orchard, Jeremiah Sparrowgrass spied a robin redbreast, singing away right merrily with his bill in the air, as if his whole soul was exhaling in the melody. Beneath, in a fork of the tree, was his mate, with a nest full of birdlings, and surely a happier family group was not to be found anywhere in the country. Bang went the gun of Jeremiah Sparrowgrass, and that morning song was ended. It was owing entirely to the inexperience of the sportsman that a husband and lover was not also ended, and a whole brood bereaved of their natural protector. The report of the gun brought out Deacon Smith before the heroic Mr Sparrowgrass had time to reload his piece and make a demonstration on the mother, who was fluttering and crying in a state of great apprehension in the tree tops. Jerry knew the Deacon as well as any boy knows his senior in a country church that he has always attended, but this morning affected ignorance, both of the Deacon and his robins.

" My dear sir, will you have the kindness to inform me what species of bird this is? I am making a collection of the feathered tribe for my *herbarium*, and should like to add this specimen to my list."

" This bird," replied the Deacon, " is known as the Condor of the Andes, the same kind that sometimes carries off calves."

Jeremiah Sparrowgrass, merchant of New York City, did not stop to finish loading his gun, but sloped in the most expeditio
manner.

He crossed the road and struck into tl
cow pasture of Tim Bunker, thinking les
probably, of his *herbarium* and scientific attai
ments, than before he shot at the robi
Here he found birds more plenty than l
had known them in his boyhood. A regul
tion of Hookertown, which prohibits shoo
ing certain varieties of birds on anothe
land, under a heavy penalty, proves a ve
efficient protection, and the birds have mul
plied wherever the citizens have enforc
it. Timothy Bunker, Esq., being a Justi
of the Peace, and arriving at the hono
somewhat late in life, had zealously enforc
the regulation in his neighbourhood, not on
to maintain the dignity of the law, but to pr
tect his own fields against the depredatio
of insects. Though a very conservati
man, he could see the benefits of the la
and promptly warned off all intruders from h
wood and swamp pastures, where the bir
loved to congregate.

Jeremiah Sparrowgrass was first salut
by a bobolink from the stake of a r
fence:—

" Link, link-ee, wink, wink-ee, sweetc
sweetch-ee-ee, wee, wee-ee-ee-ee." His fi
brought down poor Bob O'Lincoln,
wounded, dying bird, and waked up Ti
Bunker, who happened to be in the adjoini
field planting corn. The genteel mercha
in pursuit of country pleasures, was just ba
ging his game when Esq. Bunker came u
Sparrowgrass had only got as far as "
dear sir, will you have the kindness," in
stereotyped speech of inquiry, when he w
interrupted.

" Why, Jerry, is this you, out here
Hookertown again killing our birds. Y
ought to be ashamed of yourself, shooting
poor skunk blackbird. What harm has
ever done you? His song is a little crooke
I allow, but cold lead is not the stuff
straighten it with. It is the same so
the Almighty gin him to sing, and he has
good a right to sing it as you have to measu
tape. It is a most inhuman thing to k
birds when they are laying their eggs a
hatching their young. Besides, Jerry, we'
got a law agin it, and all good citizens oug
to obey it. The birds are the best frien
the farmers have, and we have learned bett
than to kill the crows, as we used to wh
they pulled the corn. Now, Jerry, put
your shooting iron and go straight home
widow Sparrowgrass's, and if you sho

another bird in these parts I'll have you fined before night."

Mr Jeremiah Sparrowgrass withdrew immediately, being particularly disgusted that an old farmer should call a city merchant "Jerry," and very much out of humour with the Hookertown bird law.

The statute, however, is likely to stand for some years to come.—Ed.

NO. V.—GUANO IN THE HILL AND NO PAPER.

We recently met a man driving fast, with a very long face. He was in pursuit of the Editor, and reining up his steed, he opened his complaint.

"I heerd tell great stories about the dewings of that foreign manure in your paper. Deacon Smith tried it and I seed the account of it in Tim Bunker's papers. So I sent down to York this spring, and got a half ton of guano and put it on to my corn. I was detarmined to give it a fair trial, and slap'd a hull handful into every hill. I planted it more than three weeks ago, and it aint up yet; and I am plaguy 'fraid that aint the worst of it. Now I want to know what is the matter and what I shall dew."

"My dear sir, I see you do not take the papers, but only borrow Tim Bunker's paper occasionally, and do not half read that."

"True as gospel, Mr Editor, but how did you know that?"

"Know it! Why your story convicts you of not taking the papers. You cannot find in the country an agricultural paper so poorly edited that it would not tell you better than to put guano into the hill, especially a whole handful. That is enough to rot a whole handful of corn."

"Dew tell!"

"Your corn will never see the light, neighbour, and you must sow it over again."

"You don't say so!"

"You should have sowed your guano broadcast, and ploughed it in immediately; then it would have been diffused equally in the soil, and would have given you a good crop."

"I never thought of that."

"You ought to have taken the papers. In this operation you see you have lost five days' work, worth at least twenty shillings, and it is now so late that your corn will not be nearly as good as it would have been, if sown earlier. You will lose at least twenty shillings on every acre of corn you sow, for want of this information about the proper method of using guano. Twenty shillings in loss of labou
and sixty in loss of time, make four pound
which would furnish you with at least hal
a-dozen of the best agricultural journals i
the country, and pay the postage o
them."

"I should not wonder if that was so."

We left our unfortunate friend, scratchin
his head now radiant with a new ide
What the result will be, of course, we canno
tell. But we expect better things in th
future. Hundreds of cases like this are t
be found all over the country. Men hear c
guano, and take it for granted it is of no cor
sequence how they use it; they put it in b
the handful, and sow the seed directly upo
it. Farmers should read and think mor
It is very expensive to cultivate the soil wit
out knowledge. Take the papers.—Ed.

NO. VI.—TIM BUNKER ON FISH MANURE.

Hookertown has been thrown into quit
a ferment lately, by the arrival of num
rous loads of fish from the shore for th
purpose of manure. The muck heaps a
in a ferment with the fish, and the peop
with the talk about them. As in all ne
enterprizes, there is a great difference
opinion, and almost every man is as decide
in his views as if he had used fish manu
from his boyhood. Some declare that t
fish cannot be used without making an odou
more distinguished than all the spice grov
of the tropics, and that the man ought to
prosecuted who will put stinking fish in a
field within a mile of the road. Others thi
the fish are good for nothing after they a
put upon the land. There is nothing li
the good old stuff right out of the farm-yar
But the majority are bound to try t
article, as they agreed last winter to tak
some fifty thousand, some sixty, and some
hundred thousand. They live too far fro
the shore to apply them fresh to the growi
crops, and they are almost without excepti
putting them into heaps and covering the
with peat and muck. As this latter article
abundant, they use five or six loads of it
one of the fish. Tim Bunker very early co
sulted Deacon Smith and the back numb
of his agricultural paper, and after thinki
the whole matter over a few days, he ca
to the conclusion that he would go in
fifty thousand of the fish and run the risk
it. The very first load of the article
brought through the street he was hailed
Mr Jotham Sparrowgrass, the uncle of Je

miah, of bird-killing memory. Jotham was wise in the ways of his fathers, and knew all about the fish, for he had lived over on Long Island when he was a boy.

"Well, Squire Bunker, I suppose you think you are going to do a nice thing with them 'ere fish, but let me tell you, you don't know everything if you do take the papers. Fish pizens land. I've seen it tried time and again, and I never knew it to fail."

"How do you know that, Jotham?"

"Why, you see, sir, that paper is filling your head full of foolish notions. When I was a boy, my father and all his neighbours used to use fish; John Woodhull, Tom Tuttle, Ben Miller, and a lot more. They got mighty great crops for a few years, and then the land got to be so poor that fish didn't produce no more effect upon it than so much sand. They came to the conclusion fish pizened the sile, and I never have thought much of fish since."

"Well, Jotham, can you tell me if they used anything else besides fish for manure?"

"No, they didn't. You see fish was so plenty in Peconic Bay, all along the shores of Southold, that they thought it was of no use to cart dirt into their yards."

"Well, that was the trouble with them, Jotham, and the reason that the land run to sorrel and moss. Deacon Smith has studied into this matter a little more than I have, and the Deacon says that if we only use muck with fish, or if we turn in green crops occasionally, the land will grow better all the while, and produce great crops. He says the fish stimulate the soil to produce great crops of corn, oats, hay, &c., and immense quantities of carbonaceous matter are carried off, and the soil is soon exhausted unless we put back the carbon in some way."

"I don't believe a word about your carbonates, Tim Bunker, and the other stuff you and the Deacon get out of the papers. I tell you fish will pizen the land, and Hookertown will be a desert in less than five years if you keep carting these stinking fish into town."

"But if fish spoil the land, uncle Jotham, why do they keep using them on the Island? One town over there raised 20,000 bushels of wheat and corn last year, rye and oats in great quantities, and it was just where they used fish in greatest abundance."

"I don't believe a word on't. That wheat crop, you see, was growed on paper. You can't raise wheat in this part of the country. The sile is too old."

"Well, uncle Jotham, I see you are dead set agin the fish, but I have made up my mind to buy them, and I think I shall shew you they won't spoil the land."

Timothy Bunker, Esq., touched up his span and ended the conference; while uncle Jotham struck his cane upon the ground with great emphasis and tugged off, muttering as he went: "Who would have thought it! Tim Bunker using bony fish! It's no use; they pizen the sile."—ED.

NO. VII.—TIM BUNKER ON SUBSOILING.

It has been stirring times in Hookertown recently, on account of the advent of the subsoil plough. Deacon Smith had one last spring, and if Barnum's elephant had come along with it, the team would not have made half the talk the plough made. Elephants they had all seen or heard of at the menagerie, as a kind of monster never designed to run in opposition to horses or any other farm team. But a subsoil plough was "a new fangled consarn that the Deacon was gwine to poke into the yaller dirt to astonish the natives." It was entirely contrary to all well-established notions in this venerable community, and was looked upon as an intruder.

The Deacon's barn-yard was a scene for a painter when the neighbours dropped in to examine the new tool. Tim Bunker was there, of course, and Jotham Sparrowgrass, Seth Twiggs, the smoker, John Tinker, and Tom Jones.

'Squire Bunker's views were not very definite as to the construction of the plough, and he wanted to know:

"Why, Deacon, where is the mouldboard?"

"I should not wonder if it screwed on," responded Mr Twiggs, half inquiringly.

"Now, what do you call that ere article?" asked Tom Jones.

"It is a mighty lean looking consarn, ain't it?" says John Tinker.

"And I guess the crops it will make will be leaner," chimed in Jotham Sparrowgrass. "You see, Deacon, I know all about these subsoilers. They tried an experiment when I was a boy, over on the Island. You know Ben Miller got a notion in his head that the fish manure all leaked down into the sile, and that was the reason why we did not get any better crops after we had used them a few years. So he took his old plain lot, and ploughed two furrows in a place, and turned up the biggest sight of yaller dirt you ever laid eyes on. It looked for all the world like so many acres of Scotch snuff. The result was that he planted corn there, and did not get ten bushels to the acre. The land was spilte, and it is of no use to talk to me about stirring the subsile."

Argument of course was out of the question, and the Deacon shewed his good sense by leaving the plough to speak for itself. He subsoiled a field properly, and planted with corn. He also induced Tim Bunker to try it on a patch of his garden where he was purposing to plant carrots and melons.

The month of July brought a drouth in Hookertown. Uncle Jotham's garden felt it severely, and he had plenty of neighbours to sympathize with him in his lamentations over withered vegetables.

Tim Bunker called him into his garden one day as he was passing.

"See here, I want you to look at my carrots, and see how green they are where I used the Deacon's subsoil plough. They are growing now as fast as if they had a plenty of rain, and over there is a piece in John Tinker's garden that looks as if the lightning had struck it. He put on a good deal more manure than I did, and you see the difference."

"Who would have thought it!" exclaimed Uncle Jotham. "I guess you have put on water."

"Have you seen the Deacon's garden? It is all as green as a leek, and nobody would think there had been no rain for three weeks. You see there is no getting round the facts, and I have made up my mind to try a subsoil plough this fall. It must be a great thing to guard crops against drouth, and I shall try on the piece of land that I sow with rye."

Jotham Sparrowgrass was much less voluble than usual during the call, and went home soliloquizing. "Wonder if Tim Bunker did water them carrots!"—Ed.

NO. VIII.—TIM BUNKER GOING TO THE S

"Dew tell, Squire Bunker, if you're g to exhibit at the county fair this fall," Seth Twiggs, as he lighted his third and took his hat. "I never was tu on them shows in my life, but I have heern te the big carrots and cabbages, and I tho you would be after sending up some of garden sass, it is so mighty nice." Seth kept his eye on the subsoil plough after found it had no mould-board, and occas ally looked into the Deacon's garden, as as into Squire Bunker's.

"Shouldn't wonder if I did," replied Bunker. "You see, I went up last year the first time, not thinking it was worth w to take up anything to shew. But I fo when I got there that Hookertown was n ing as good a show as any other town in county, and there were some things t that took premiums that I could have bea even before my garden had the sub plough in it. Wife planted a squash at edge of the carrot bed, and the vine ha half dozen whoppers on it. The big there will weigh 150 lb., and she decl 'that squash must be seen.' Then John a bed of onions, some of them measurin inches across; and some California potat weighing two pounds apiece. Our Sall tip-top on bread-making, and says she bound to take a premium, for the minis are to be the judges, and will give a righte award. The bees have done well this y and whiter honey never was seen than have in our boxes. The carrots of the s soiled land of course must go up. I m sured one the other day 20¼ inches lo and I think I can find a bushel of the sa length and size. Yes, sir, Mr Twiggs, shall all go up to the show to-morrow mo ing."—Ed.

Notes and Queries.

LXXVIII. CATTLE FEEDING.

It must be admitted, says a writer, that the subject of cattle feeding is one of the most important that can be brought under the consideration of a farmers' club. Yet it must also be allowed that every farmer knows practically, if not theoretically, the ordinary mode of making an animal ready for the flesher. The latter are, as a class, good judges of the quantity of beef and mutton which are in daily want by their customers, and unless animals of this description are prepared for them they decline purchasing. There is thus a necessity laid on every person who make their living by rearing and feeding cattle to be up to the mark. I fancy it will be generally agreed that rearing calves is the first step, and an important one, in feeding. Calves are either allowed to suckle their dams, or, as is more generally practised, fed by the hand from the pail. The former being the natural mode of rearing, little personal superintendence or labour is required, and if the principal object is to make a good beast, what can surpass the food provided by nature, and given in the natural way? But, as already hinted, there are far more calves reared by hand than by suckling, and first-rate animals are reared and fed in this manner. A calf will drink 3 quarts, or ¾ of a gallon, of warm milk at each meal, and it should get three meals a day, which will make 2½ gallons daily for the first month; after that period, until it is weaned, it should get two meals a-day, and as much as it can drink. Some people will grudge so much sweet milk to calves, and, after a few days, take the cream off it and give them skim milk instead, and this is considered thrifty management; but although it may insure immediate gain in the cream, it will insure ultimate loss in the calf, as it is not possible to derive a double advantage from a given quantity of milk. But a good calf, which is to become the large stall-fed animal hereafter, cannot be well brought up in any other way than by a liberal allowance of sweet milk; but if butter is preferred to a good beast at an after period, the wish is attained, but the farmer ought to know that he cannot have butter and a good beast from the identical milk; and when any other substitute is used instead of milk, it is a practical avowal that the farmer does not wish to bring up his stock as he might. From what has been mentioned, I am of opinion that calves should be allowed a full quantity of warm milk for at least three months, and the longer the better. When they are weaned it is a critical period, and should be done gradually, when grass is abundant; and good home-
made linseed-cake is perhaps the best substitute
the milk withdrawn. It takes little labour
prepare it, and almost every animal eats it greedi
Having followed the calf this length, by attention a
liberal freeding in his winter quarters, and bein
well-bred beast, it should attain to a good size
spring, when it can either be sold or grazed, accordi
to circumstances. If sold, a calf treated in this w
should sell, at a year old, at from £9 to £10, wher
calves not getting the same generous treatment,
fed on substitutes instead of warm milk, must rem
a year longer on hand before realizing the same mon
The next final step in the process of feeding is eit
on grass in summer, or in courts or byres in wint
I need say nothing as to management on grass, whi
is well understood by every practical farmer. Th
are various opinions as to the best mode of acco
modating stock in winter. Each has its advantag
Perhaps loose boxes, if there were enough of roo
are the best; and an open loose court the worst.
own preference, taking space into consideration,
for stalls in a comfortable byre. There every anim
can be properly and individually attended to. T
strong can have no undue advantage over the wea
But when kept tied in byres, the animals should be da
curried, and no better instrument can be used than
old currycomb, assisted by a wisp of straw. Curryi
should only be performed on the cattle while not eati
their food, and this should be strictly enjoine
for people who have charge of animals have a stro
propensity to dress and fondle them when at foo
from no desire to torment them, but chiefly becau
they are then in a quiet mood. Still, the process h
a tendency to irritate some cattle, and please others
so much so as to make them give up eating, and on th
account it should be prevented. It is supposed that
ox which attains the weight of 8 cwt. will consu
200 lb. of turnips daily, or about 16 tons during t
feeding season of twenty-six weeks. Besides turni
and straw, various other artificial substances are us
in feeding, such as hay, potatoes, oilcake, distille
draff and dreg. Oats, barley, rye, and the meal
peas and beans, have all been pressed into the servi
of feeding cattle. Doubtless, the finest beef is ma
by using either of the above-mentioned grains; b
these should be used only as auxiliaries to turnips a
straw, in order to leave a profit, and unless low
price, they will not leave any profit in feeding, unle
indirectly in the dung. I would think hay a go
economical food when sold at less than 7d. per ston
oats, if at less than 22s. per quarter; barley, if at l

than 25s. per quarter. When any of these articles are sold under the above figures, they should be used. Turnips thereby would be economised, and more animals could be fed than the ordinary turnip break would warrant. Some will object to using any of the grain crop for feeding animals, considering it a waste of human food, but I only advocate their use when abundant, and at a low price; and, besides, when used in feeding cattle, they are still converted into the most valuable human food. But perhaps the most legitimate auxiliary is linseed cake, if it is at a moderate price, which it is not now, nor has been for years. Linseed must be crushed for the sake of the oil, and the same objection would not apply to it as to the cereal grains. I believe if this article could be sold at from £8 to £8, 10s. per ton, animals could be as profitably fed on half allowance of turnip and cake as they could be on a full allowance of turnips without cake. But I would say that the generality of farmers will find the most profitable system of feeding to be on turnips and straw. You may not have the quality of the dung so good, nor will you be exposed to a complaint I heard from Mr M'Lean, of occasionally getting cattle too fat.

LXXIX. COUCH-GRASS AS A REMEDY, AND AS A FOOD.

An infusion of the Triticum repens (couch-grass), in the proportion of 1 ounce of the dried and cut stem to a pint of water, and given in the course of the day, has been found by Mr H. Thompson of the University Hospital, to be very beneficial in irritable conditions of the bladder. According to him, it is important that the plant should be gathered in the spring, shortly before the leaves appear; the stem is then to be slowly dried without artificial heat, and cut into the requisite lengths for use. Professor Burnett, speaking of this grass, says, "The couch-grass of the farmers, which is here regarded as a noisome weed, is collected on the Continent as food for horses. Cattle of all kinds are fond of the underground shoots of this plant, which are sweet and wholesome. Sir Humphry Davy found them to contain nearly three times as much nutritious matter as the stalks and leaves, and it has been stated, on the authority of a French veterinary surgeon, that exhausted and worn-out horses are very speedily restored to strength and condition, by giving them daily one or two bundles of couch-grass, of 10 or 12 lb. weight each, mixed with carrots."

LXXX. THE SHILLING DUTY ON CORN.

The provision of the Budget abolishing the last remaining shilling duty on foreign corn, and which took effect on June 1, sweeps away a relic which has existed as a reminder of the great struggle between Free Trade and Protection a quarter of a century ago. The Act retaining the one shilling duty has been in operation rather over twenty years. From the passing of the Corn Importation Bill of Sir R. Peel in 1846, abolishing the sliding scale which had kept up the price of wheat to over 70s. a quarter, it was enacted that a greatly reduced duty should be levied until February 1, 1849, when a uniform rate of one shilling should be imposed upon the importation of all kinds of grain. This enactment is now repealed.

LXXXI. A REMEDY FOR THE POTATO DISEASE.

In all affected potatoes, even before the disease is visible to the naked eye, there is to be found a degree of moisture very far in excess of that met with in sound potatoes; and this watery principle gradually increases until the disease itself makes its appearance, when t character of the potato is changed, and the transiti from comparative soundness to complete rottenness sometimes the work of a day, but oftener the doin of an hour. Cultivators are indebted to Profess Bollman, of St Petersburg, for the accidental di covery of a remedy which has been found to answer well in Russia, that on many estates drying-hous have been built for the purpose of carrying out tl experiment; and as it has been in operation in th country since 1853, it has consequently undergo seven years' trial. In the autumn of 1853 Profess Bollman received from a friend, a colonel in tl Russian army stationed in Siberia, a sample of a ne potato, with which he received two recommendation namely, good in quality, and a perfect hundredfo in produce. These potatoes were accidentally plac on the back of a stove used for heating the professo study, where, by some mischance, they were forgott till the planting season arrived; when discovered th were shrivelled so much that fears were entertain they would not grow at all. However, the potato were planted, and nourished to such a degree that tl two recommendations before mentioned were pr nounced to be verified; and, what was more remarkab still, although all the potatoes in the neighbourhoo and throughout the country were more or less affecte by disease, every potato of the new kind was entirel free from the disorder. This induced the profess to adopt the expedient of drying, and in consequen the entire produce was submitted immediately aft being dug to a high temperature, which had the effe of charring some of the potatoes, and shrivelling th rest. It was surmised at the time that the charre potatoes were killed; they were nevertheless plante at the proper season, and the charred potatoes gre and did quite as well as those potatoes which wer merely shrivelled. The year 1855 also proved tha although the disease was generally distributed throughout the country, not one of the professor's ne potatoes were affected by it. The experiment wa again repeated in 1856, and the crop exhibited th same freedom from disease. The kinds mostly i cultivation were then operated on, sorts which wer yearly more or less affected by the disease, still wit the same result. The digging time of 1857 produce a splendid crop of potatoes. Upwards of 3 acres wer planted with kiln-dried potatoes, and although th produce exceeded 1600 bushels, not a diseased potat was discovered. In 1858 Professor Bollman erecte a drying-house with heated floors on his estate, an within the past two years similar erections have take place in the different estates of the principal lande proprietors. It is gratifying to find that the action o the shrivelling process on the potatoes already disease arrests the progress of the infection, and kills th disease, thus leaving a portion of the potato soun enough to be eligible for spring planting. It has bee stated that by the constant raising new varieties fro seed for planting, the disease may be considerabl diminished, and this proved to be the case with th fluke kidney. For the first two years after it was introduced, and even after its cultivation had becom pretty general, this famous kidney had not bee attacked by disease; but last year the fluke has bee in some instances as badly diseased as the fortyfold regents, &c., so that the process of kiln-drying promises far greater advantages and more certain result than all the expedients put together which have from time to time been offered for the consideration of th public.

LXXXII. POINTS OF A GOOD DAIRY COW.

The following, by a good authority, gives the points which indicate good milking qualities in dairy cows :—"The most prominent of these are the vessels which co-operate in the production of milk. These consist of the vessels which bring the blood, the glands which separate the milk, and the veins which carry away the blood when thus acted on. Of the former I may name those veins which shew themselves between the bearing and the udder. These are often buried so that they cannot be seen, and although on pressure, immediately above the udder, they frequently appear, yet we must not immediately condemn the animal as a bad milker when they cannot be observed. Generally, if the skin is mellow, and not much fat present, these veins shew themselves readily. Their presence is very desirable ; and combined with a full development upon the surface of the udder, they indicate a free supply of blood to the milk glands. It is also considered a good point when these veins present a knotty appearance. The milk glands are situated in the upper portion of the udder, and are generally four in number, each gland being in connexion with its own quarter of the udder. The udder should be capacious, extending well behind the legs, and also forward under the belly; the coat should be thin, with a soft skin, and shew considerable decrease in size after the cow is milked. The teats, which are the channels from the four reservoirs in the udder, should be placed well apart from each other, and not cramped together, for this generally indicates a want of sympathy in one udder. The udder may appear large, and yet be fleshy rather than capacious. After the blood has been acted on by the glands, it is conveyed away by the veins, but none of these can be seen externally. The milk vein, which runs along the side of the belly, has been called so from its supposed connexion with the udder ; but such is not the case. Especial attention is desirable to the mellowness of the skin, and more particularly if the animal is poor. This vein is a sure indication of the quality of the blood supplied, and for all practical purposes may be taken as a guide. Some attention also has been given within a few years to a discovery made by Mons. Guenon respecting the *escutcheon*, as it is termed. It can scarcely have escaped the reader's notice, that the hair on the buttocks of cattle grows in two different directions, one portion pointing upwards, and another part downwards, and thus producing a sort of fringe at the point of juncture. This hair, which has an upward tendency, has been termed the "escutcheon." A very extended observation has proved that, other conditions being equal, the modification of form presented by the escutcheon will lead to an estimation, not of the quantity of milk which the animal will produce, but also of the time during which the cow will keep up the supply of milk. Without going much into detail on this point, I may briefly state that the larger the extent of the escutcheon, the greater is the promise of milk, and also of the continuance, even after the cow is again in calf. A cow may have a small escutcheon, and yet be a good milker ; but observation leads to the conclusion that if she possessed a more fully developed escutcheon, she would have been a better milker. It may be considered a point of merit, not as deciding whether or not the cow is a good milker, but rather as an additional indication, which may be taken into consideration in conjunction with other characteristic points. It is also desirable, in estimating the extent of the escutcheon, to make full allowance for the folds in the skin, otherwise a large escutcheon may be taken fo
small one. Besides the escutcheon, there are tufts
hair (epis) which have a certain degree of value wl
seen upon the udder of a cow.

LXXXIII. GAS-LIME AS A MANURE.

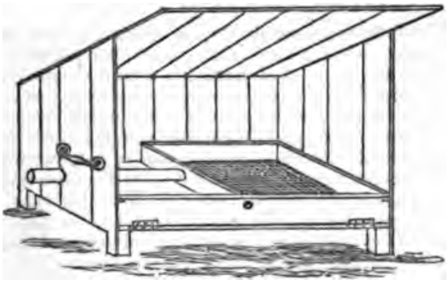
The following remarks on this substance are by
Voelcker :—"The lime in the gas purifier principa
answers the purpose of removing from the crude g
as it issues from the retorts, sulphureted hydrogen
carbonic acid. The slaked lime consequently becor
more or less changed into carbonate of lime and i
sulphuret of calcium a combination of sulphur w
calcium—the metallic base of lime. At the same tin
some tarry matter, a little ammonia, and other volat
substances, pass into the gas purifiers, and are in p
retained by the lime in a mechanical way. Wh
gas-lime is first exposed to the atmosphere it gives
a very bad smell, which arises principally from
sulphur compounds in this substance ; after some ti
the bad smell diminishes, and at last becomes alm
imperceptible. This shews that the sulphurous co
pounds in gas-lime undergo changes on keepi
which may be stated briefly to consist in the grad
oxidation of sulphuret of calcium, which, passi
through the formation of sulphate of calcium, termina
in the production of sulphate of lime, or gypsu
Gas-lime kept for some time thus always conta
some gypsum. From these remarks, it w
be gathered that gas lime contains the following
gredients :—Carbonate of lime, lime hydrate, sulphu
of calcium (mere traces), sulphite of lime, sulphate
lime, small quantities of tarry matters, a little amm
nia, water, and, of course, all the impurities which
contained originally in the quicklime employed in t
gas-works. The relative proportions of the chief cc
stituents of gas-lime will be recognised by throwing
glance at the subjoined table, which gives the comp
sition of gas-lime when dried at 212 deg. Fahrenheit :

Water of combination, and a little organic matter	7.24
Oxides of iron and alumina	2.49
Sulphate of lime	4.64
Sulphite of lime	15.19
Carbonate of lime	49.40
Caustic lime	18.23
Magnesia and alkalies	2.53
Insoluble silicious matter	0.28
	100.00

It need hardly be stated that the composition
gas-lime, for obvious reasons, must be subject to gre
variations. In fresh gas-lime the proportion of wat
amounts from 30 to 40 per cent. Gas-lime, it will
seen, contains a good deal of sulphite of lime—*i.e.*,
combination of lime with sulphurous acid. Th
combination is readily decomposed even by carbon
acid ; and as sulphurous acid, which is readily liberat
by the carbonic in the soil, is injurious to vegetatio
gas-lime should not be applied to the land in too fre
a state, for in such a state it is decidedly mischievou
even when used in moderate quantities. The safe
plan of using gas-lime appears to me to employ it
the shape of a compost. Mixed with refuse matte
whether of animal or vegetable origin, gas-lime,
keeping for five, or better, for six months, becom
transformed into a very useful fertilizer for all so
naturally poor in lime. In fact, gas-lime may be us
with equal advantage as quick-lime in making lin
compost heaps."

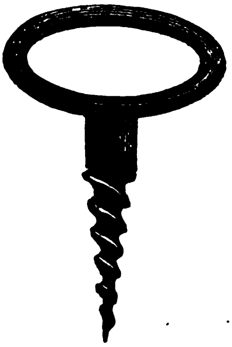
LXXXIV. POULTRY DUST BATH.

I send you the accompanying sketch from the *Field*, which represents a very convenient portable dusting place for fowls. It is furnished with a sieve worked by a handle at the side, and may be used, if required, as a cinder sifter. For fowls it offers the great advantage of keeping the dust bath dry, and so preventing the birds encrusting themselves in mud, when they only intend ridding themselves of pediculi. The apparatus is designed and manufactured by Messrs Crook, of Carnaby Street, Regent Street.—*R.*



LXXXV. PORTABLE HITCHING RING.

Who has not been annoyed by not being able to find a suitable place to tie a horse? In the country perhaps one might find trees, or buildings, o timbers; in the town, wooden side-walks, awnin posts, trees, &c., but often no hitching posts at convenient points. A valued correspondent, whose lette is unfortunately mislaid, writes that he finds an articl like the one figured exceedingly convenient. This i a strong, tapering screw, with ring handle, which ma with ease be firmly set in any fixed woodwork, o tree, by the roadside. This is a form of cooper's vic which may probably be found in the hardware store though the common form of cooper's vice has a longe shank and too small a hole in the flat handle. good blacksmith can easily make one.



Our Library Table.

The Parks, Promenades, and Gardens of Paris. By W. Robinson, F.L.S. London: John Murray.

This book is the result of the author's sojourn in Paris during the Great Paris Exhibition in 1867 as the *Times'* correspondent for the horticultural department. The author passes under review the great parks and public gardens, the square, the boulevards, and such places where decoration is carried on in the way of planting with trees, shrubs, and such like suitable material for increasing the comfort of the citizens, and enhancing the general effect of the city itself. He describes and considers these in relation to the wants and comforts of our own cities, shews, in that respect, we have much to learn from our Gallic brethren, and propounds, especially in the introductory chapter of his book, a scheme whereby the great matter of expense might be got over, and the pent up East-end Londoners agreeably let loose to the enjoyment of fine avenues of trees, and other kinds of embellishment which the reader can peruse in his studio in conning over the book itself. We can well understand the benefits that would flow from such a revolution among the London streets, but we must part company with our author as to the possibility of the
scheme ever being carried out among a "natic
keepers." Over and above all this has Mr
estimated, not only the thousands but the n
treasure that it would take to buy up the p
land and houses—that his scheme, in its simp
would involve. The hope that a portion
vast expenditure for arsenals, armies, fl
fortifications, may some day be diverted t
such alterations in our cities, as will render p
them the rearing of worthy representativ
English race," has been already looked u
were possible to do it, as a means for cheap
breakfast table. Our author's zeal would r
much at the Board of Trade, so long as
people's champion who has other ground tha
city in his eye, remains at the helm. The
the plan, and the author's determination t
with it, must strike every reader, but
appears only a magnificent dream. The
tion of the various places of interes
first eight chapters are racily written, and
ample illustrations with which the letterpres
spersed, it must draw many appreciative rea
us who have gone over the ground and lool
places with very much the same eyes as the a

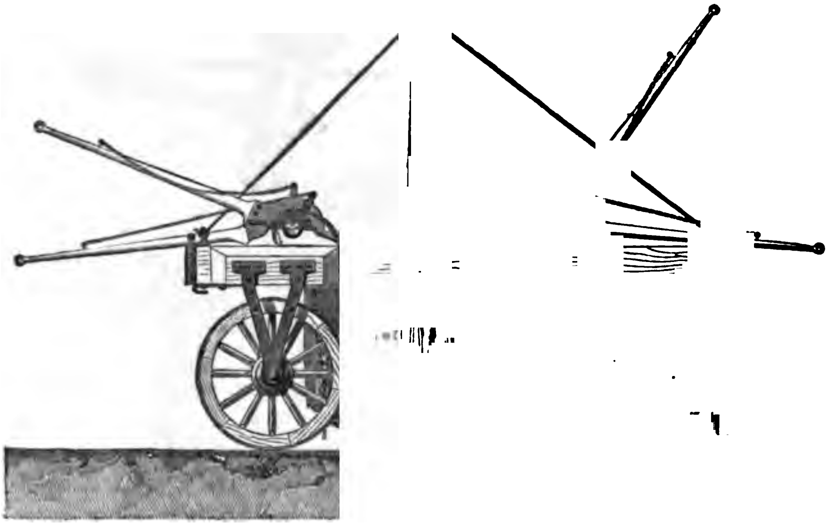


Fig. 1.

had a double interest in perusing the work, and must subscribe to the general accuracy of the matter in detail.

In the chapter on trees for city parks and avenues there is some well-directed information. A useful transplanting implement is descanted upon and amply illustrated, for lifting and removing trees with balls of 2 tons and upwards. We give a representation of it, with a tree in course of removal (fig. 1). Deciduous trees and shrubs are insisted upon, where the contaminating influence of "blacks," especially during the dark days, tell so wofully. The splendid planes in Berkeley Square are alluded to as resisting all the hostile influences going, and it might be added, independent of that altogether, this denizen of the forest

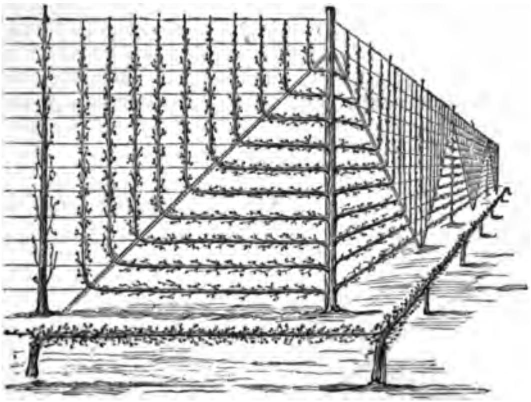


Fig. 2.

is more a surface-rooting tree than the elm, for instance, although, in point of hardiness, it is equal to the former as a town-tree, yet from its great searching roots living in the very far depths where moisture accumulates, it must, and will, and has, indeed, succumbed to the scanty supplies of moisture in and around London, owing to the deep draining sewerage scheme in recent years carried out. In point of his remarks, Mr Robinson refers to the "once handsome and healthy Araucarias planted in front of Tattersall's, at Knightsbridge, and now draped with filth and soot, the young pines and evergreens planted annually in the Regent's Park Botanic Gardens only to dwindle and die; the handsome hollies, yews, and other shrubs planted in the [illegible] gardens in the same park; the fine and [illegible] evergreens in the Royal Horticultural Society's Gardens at Kensington, when it was first laid out," all these are a standing menace to the introduction of evergreens in ci[illegible] lists [illegible] tropical [illegible] sug- [illegible] with [illegible] places in England [illegible] they are in and around the [illegible] Paris.

[illegible] ersailles [illegible] orated gardens, as well as the [illegible] Cloud, are amply illustrated [illegible] engraving. The orangery at the [illegible] described, as indeed it is [illegible]

remarkable building for size and quaint adornmen The plants themselves, unless they have been renew since our visit, were shewing a disposition to fall ba into the afternoon of life. The longevity of some them is remarkable, and one here is referred to in t work as being sown in 1421 by Leonora of Castill and although well up to the age of 500 years, in t words of the writer, is still healthy and verdant in leafage, although a little tottering, and requiring to carefully propped up.

The plant decoration of apartments is a subject n at all understood in this country. They certain manage these things better in France. The thousan of plants that are grown by the trade for this style decoration, and this alone, would surprise an Englis

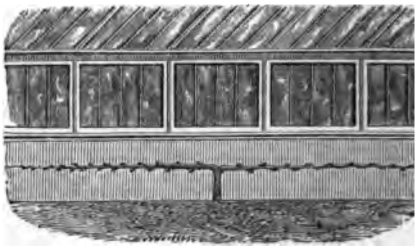


Fig. 3.

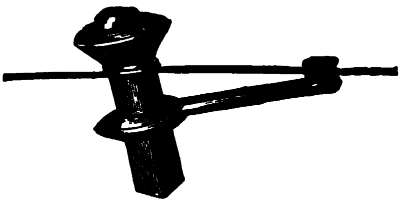


Fig. 4.

man on his first visit to Paris. The author ve properly directs attention to other things than ferns a purely Wardian case plants for this sort of work, a introduces a number of engravings, shewing the uni tiated in these matters the form and style of many cho things suitable, such as Marantas, Dracænas, Æchmea Saxifragas, Gymnostachyum, &c. The bright leav

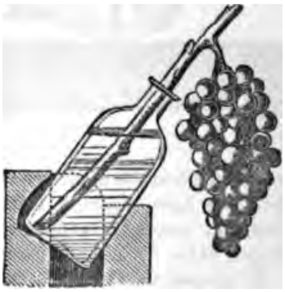


Fig. 5.

Dracæna terminalis is annually reared by one Versaill cultivator, and sold to the number of "between 50 and 6000 plants." We thoroughly endorse the followi remarks from our own observations :—"As compar with the plant decorations of one of the balls at t

Hotel de Ville, anything seen in the British Islands is poor indeed; while the very plants are arranged at the Linnæan and Royal Societies, and other important places on special occasions, is almost sufficient to prevent people tolerating them indoors at all, and yet the plants are much better grown in England than they are in France." It is purely, therefore, a want of taste on the part of our decorators, and the want of knowledge of selecting suitable materials to create an eye-sweet scene combined. Reform in the conservatory is also spoken of with the aid of such things as dwarf palms, effective tree ferns, and such plants of graceful foliage as are proved effective for individualizing, and for combination. The chapter on ivy that follows is a highly suggestive one, and the lesson inculcated recommends itself to the consideration of every one.

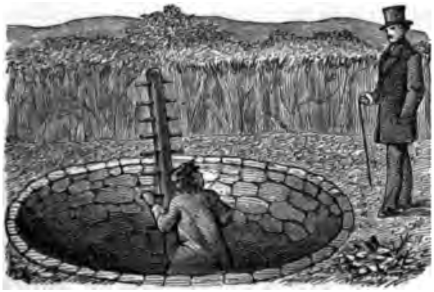


Fig. 6.

Fruit culture is elaborately treated. There are many important lessons taught by one who learned as he wrote, and yet hit upon a safe method generally. The tyro was underrated, and came out of a controversy certainly with a few scars, but with untarnished honours, and not without torturing a more learned and practical antagonist, who evidently calculated without his host. We never were very sweet upon the child's play of growing cordons, when a better account could be given of them upon a large scale. The multiple cordon—a compound sample of which is here engraved (fig. 2)—is but a modernized name of the old espalier, to us seems to be a far more profitable investment any way you like to consider the matter. The empty spaces on walls, and the box edgings for which the cordon simple is recommended, need not be cause for controversy and spicy phrases. It is purely a matter of taste and fancy, and if there be such vacancies, let them be so utilized by all me The plan is largely and successfully adopted in m parts of France, and it will find some supporters our country. The author very properly castigates growers for salè and growers generally for "masterly inactivity" which they have at all ti shewn in the cultivation of the pear particularly. shews that French growers are as careful about a p tion on the wall for their pears as we are for our peac and that they are right few independent men will q tion. The peach season is an evanescent one. The season may be prolonged in a circle, with care selection of sorts, and then proper cultivation a wards. If the author had done nothing else than shewing up of this we would be bound to admit he had done a great service. If it be true that dealer collects in France and sells in Britain £10, worth of pears, surely it opens our eyes to a neces for seeing if something cannot be done at home, prove remunerative at the same time! In order our readers may see what is meant by cordons we a representation (fig. 3) against the masonry of a gre house, and it is also shewn at the base of the multi cordon; and also that of a useful implement tightening up the wires which will be found suita for a variety of purposes other than that of fixing w walls for fruit growing. It is called by the Fren *raidisseur* (fig. 4). In the matter of training, French grower seems to have an infinitude of resour But his success mainly is attributable to the sto which he employs, the condition in which he ma tains the roots, and the position which he selects the branches and fruit, each to do their part in routine of annual culture. We are shewn that he like the busy bee and we the drones, and looking over the country the estimate is not overdrawn or simile overstretched. Vines, figs, peaches, and app are all treated of as grown on the Continent, and mu useful matter may be digested from a perusal of chapters under these headings. The mode of prese ing bunches of grapes in bottles, when cut, is here produced (fig. 5.)

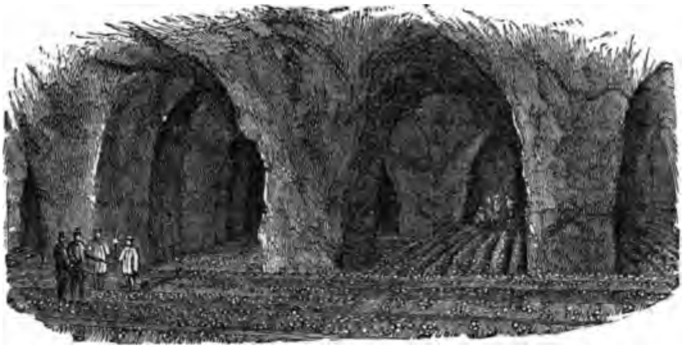


Fig. 7.

The chapter on mushroom culture is a particula interesting one. It opens up to the English cultu quite new ideas as to the cultivation of this excell vegetable of the fungal race. The mushroom cav at Mentrouge, as described and illustrated, quite a wonder. They are not unlike the shall coal-mines of our own country, but have the dis vantage of difficult access. A "champignonist leads the way over a field of wheat to the mouth of the cave (fig. 6), descends by a rude pole, with equally matched wooden steps, to about 60 feet in depth ; the sight-seer follows, and, by the aid of a lamp, threads certain tortuous passages, reaches a wide space here and a wider space there in these catacomb-like burrowings. On these spaces the beds are formed and spanned by means of flakes taken from an old bed. The author, in describing them, goes on to say :—

"Although we are from 70 to 80 feet below the surface of the ground, everything looks very neat; in fact, very much more so than could have been expected, not a particle of litter being met with. A certain length of bed is made every day in the year, and as they naturally finish one gallery, or series of galleries, at a time, the beds in each have a similar character. . . . Once more we plunge into a passage dark as ink, and find ourselves between two lines of beds in full bearing. The beautiful white butter-like mushrooms appearing everywhere in profusion along the sides of the diminutive beds, something like the drills which farmers make for green crops. See engraving (fig. 7.) When I state that there are 6 or 7 miles run of mushroom beds in the ramifications of this cave, and that their owner is but one of a large class who devote themselves to mushroom culture, th reader will have some opportunity of judging of th extent to which it is carried on about Paris. Thes caves not only supply the wants of the city abov them, but those of England and other countries als large quantities of preserved mushrooms being exporte one house alone sending to our own country no le than 14,000 boxes annually."

The culture of salads is also treated of in a comparative sense, and attention drawn to the clever mod that Frenchmen carry out in providing such things a fresh crisp lettuces in winter and spring by improvisin large quantities of cloches or bell glasses, which ar manufactured cheaply about Paris, and serve a variet of purposes in nursing on seedlings of all kinds. Th variety of lettuce called Petite Noir is used for this purpose. Then follow descriptions of the flower, fruit, an vegetable markets ; then notes on horticultural implements, with copious diagrams, making up a handsom octavo volume of 644 pages, with upwards of 400 illustrations. In a word, it is a volume full of matter, interesting and instructive to gardeners and horticultur loving people of every degree, written in good English neither dry nor dull, and merits considerable commendation.

The Garden.

PLANT IMPROVEMENT.

IN last month's *Seedsman* there is an excellent article under the above heading, in which the writer points out in a general way the material benefit to be derived by nurserymen keeping their eyes open to improving the different varieties of cultivated plants, particularly those of an edible character. In going into details the writer says :—

Let us begin with Fruits. Most of them have been so much ameliorated by one circumstance or another, that they now bear very little resemblance, in respect of quality, to their original. Who, for instance, would recognise the wild parent of the Coe's, or Green Gage Plum, in the common Sloe; or that of the Ribston, or Golden Pippin Apples in the worthless acid Crab? Or what resemblance can now be traced between our delicious Pears, whose flesh is so rich and melting, and the hard native fruit, which even birds refuse to eat? Yet these are undoubted cases of improvement, resulting from time and skill, patiently and constantly in action. With the first causes which induced plants to change their nature we are unacquainted, and, therefore, without stopping to discover whether mutability was the result of accident or not, let us take it for granted that, in all or most of them, there exists a disposition of form varieties. Cultivators take advantage of this disposition chiefly in two ways—either by constantly selecting the finest existing sorts for seed or by cross-breeding, for the purpose of procuring something of an intermediate character. In the last-named operation, indeed, resides the most important controlling power which we possess over the vegetable kingdom.

Let us advert for a moment to seeds; in sowing these for the purpose of procuring improved varieties, care should be had, not on that the seeds be taken from the finest exi ing kinds, but also that the most handso the largest, and the most perfectly ripen specimens should be those that supply t seeds. A seedling plant will in general parta more or less of the character of its pare the qualities of which are concentrated in t embryo when it has arrived at full maturit How this concentration takes place, know as little as why certain constitution peculiarities are in men transferred fro father to son and from generation to gener tion; but we know that it does take plac Now if the general qualities of a given varie are concentrated in the embryo under a circumstances, it is reasonable to suppo that they will be most especially concentrate in a seed taken from that part of a tree i which its peculiar good qualities reside in t highest degree. For instance, in the fruit an apple growing upon a north wall, there a smaller formation of sugar than in the sa variety growing on a south wall, and it ca be easily understood that the seed of that fru which is itself least capable of forming sacch rine secretions, will acquire from its parent less power of the same nature than if it ha been formed within a fruit in which t saccharine principle was abundant. It shoul therefore, be always an object in selecting variety to become the parent of a new sort, t stimulate that variety to produce the large and the most fully ripened fruit or seed th it is capable of bearing.

The power of procuring intermediate vari ties by the intermixture of the pollen an stigma of two different parents is, howeve that which most deserves consideration. W all know that hybrid plants are constant produced in every nursery establishment, and that improvements of the most remarkable kind are constantly occurring in consequence. Experiments are, however, sometimes made without the operator being exactly aware either of the precise nature of the action to which he is trusting for success, or of the limits within which his experiments should be confined.

Cross fertilisation is effected, as every one knows, by the action of the pollen of one plant upon the stigma of another, and owing to the way in which the pollen influences the stigma, and subsequently the seed, a practical consequence of great importance necessarily follows, viz., that in all cases of cross fertilisation the new variety will take chiefly after its polliniferous or male parent; and that at the same time it will acquire some of the constitutional peculiarities of its mother. In early crosses between distinct species this is particularly manifest; but in those of varieties long domesticated, so to speak, it is less apparent, the distinctions between the parents themselves being less fixed, and less clearly marked. In Coe's Golden Drop Plum, the male parent was the Yellow Magnum Bonum, the mother the Green Gage, and in some cherry and strawberry crosses, the truth of the statement just made is equally borne out.

The limits within which experiments of this kind must be confined are, however, narrow. It seems that cross fertilisation will not take place at all, or very rarely, between different species, unless these species are closely related to each other; and that the offspring of the two distinct species is itself sterile, o if it possesses the power of multiplying itse by seed, its progeny returns to the state o one or other of its parents. Hence it seldo or never has happened that cultivated fruit for instance, have had such an origin. W have no varieties raised between the Appl and the Pear, or the Plum and Cherry, or th Gooseberry and the Currant. On the othe hand, new varieties obtained by the inte mixture of two pre-existing varieties are no less prolific; but, on the contrary, often mo so than either of their parents, a fact well e emplified by the numerous sorts of Flemis pears which have been raised by cross fert lisation from an indifferent parentage withi the last half century.

In the case of fruits it is, therefore, to th intermixture of the most valuable existin varieties that raisers should trust for th amelioration of their stock; while in that o vegetables and certain plants used for pu poses of decoration, good "strains" must b perpetuated, and even improved, by savin seeds only from plants that are the best o their kind, and which contain within then selves the largest amount of good properti of which the particular strain is susceptibl "Don't learn too much, Jack, else you mu do a great deal," is a maxim which must n apply to the young nurseryman; he mu never say to Dame Nature, "I will not drin at thy fountain." On the contrary, he mu be continually watching her operations wi that closeness of observation and intelligen for which the class to which he belongs is justly distinguished.

NEW FRUITS.

TO Mr William Thomson, of Dalkeith Park, we are indebted for Golden Champion Grape, a very king among its kindred. This fine-looking variety is stated to be a hybrid between the Champion Hamburg and the Bowood Muscat twice removed. The berries are of unusually large size, resembling in general appearance finely-grown Canon Hall Muscats. Like the latter, it is golden in colour when fully ripe, and partakes very much of its flavour, though it is essentially a Hamburg in constitution, and will be found to make a most suitable companion to th still most useful of all Grapes, the Bla Hamburg. Mr Thomson has also raised White Lady Downes, a seedling from La Downes crossed with Bowood Muscat. is said to have the same vigorous habit growth as its black parent, to be equal fruitful, to set more freely, to require le heat, and to be not so liable to scald as t black kind. It is reported also to keep long, if not longer, than the last-named so and to be equally good in flavour. Of th ve not ourselves seen fruit; but it has re- d, we understand, one or two first-class icates at meetings at which it has been n. Some curious crosses of Mr Pearson's (of vell) from the Strawberry Grape, a finely med, though, in other respects, worthless ty, are deserving of especial mention, ining, as they do, strawberry scent with at flavour—the latter too musky indeed pleasant, and the flesh being of the liar slimy texture belonging to all the rican or Fox Grapes, as they are called. break, however, is an important one, could scarcely have been anticipated, one from which we may yet hope to n scented grapes of good quality. To may be termed Hardy Grapes, we have ng of importance to add, and we trust hybridists may soon be induced to turn attention in that direction. What is ed is grapes of large size and good ty, that will ripen early and well in the air of this country.

r novelties in the way of Peaches and arines, we are still under obligations to Rivers, of Sawbridgeworth. Foremost g Peaches is Magdala, raised from rs' Orange Nectarine, a variety of medium which ripens in August, has a tender ng flesh, and a flavour "quite original exquisite." Another variety, a seedling Cooledge's Favourite, is also one of promise. A new yellow-fleshed Peach r Pearson's may be mentioned as an isition to that class, although yellow- d sorts are not generally looked upon much favour in this country; why, it is ult to say, for there is something pecu- pleasing and warm-looking about them, h in flavour they are, as a rule, inferior ther sorts. Those with deep orange- red flesh, like the Salway, are the remarkable for a dull sweetness. They to require the fierce sun of America to them to perfection. There are some ds recently raised which have flesh of a lemon, and which partake of the raciness white-fleshed varieties. This we learn Mr Rivers.

vers of Figs will be pleased with the o Largo, a fine kind, introduced from by Mr Fleming, of Cliveden. It is in size, prolific, and excellent in flavour. assotte Grise, though not new, is but known. It, however, deserves to be ht prominently into notice, for it is, ut exception, the richest of all figs when caught in perfection. The Col de Signora Bianca Panachée is also an extremely good and a particularly beautiful sort, being prettily striped with broad bands of green and yellow, on which account alone it would be useful on the dessert table.

Among Apples, the following are worthy of notice, viz., Annie Elizabeth, a large culinary winter variety; Beauty of Waltham, an autumn dessert sort, and Coole's Seedling, another dessert sort of really good quality. Lord Stanley, a large conical shaped, bluntly angular variety, raised by Messrs Ewing, of Norwich, is also well worth naming. Its flesh is yellowish, firm, briskly acid, and good in flavour. It is said to keep sound till May.

Foremost among Pears may be mentioned the Summer Beurre d'Aremberg, a real acquisition, which ripens in August, and which was raised by Mr Rivers from the old Beurre d'Aremberg. Beurre du Cercle, a large October Pear, is an introduction from the Continent; it has flesh resembling that of the Marie Louise and Glout Morceau; and Madam Treyve may not only be pointed out as one of the most beautiful Pears in existence, but also as one of most excellent quality.

To Cherries and Plums we have had of late few important additions. The earliest of all Cherries is the Guigne tres Précoce, a medium sized, dark purple fruit, very hardy and prolific, and the Early Lamaurie, much like that very fine sort the Early Purple Guigne, but hardier, and a better bearer. Of new Plums, the Late Rivers, an October Plum, is one of our latest; and one or two, or more, very hardy kinds raised by Mr Rivers, are likely to be valuable. Among these, the August Prolific and Purple Jefferson deserve mention.

Strawberries are rapidly advancing in the way of good properties. Some seedlings raised by Mr Wm. Paul and Mr Standish will doubtless prove acquisitions, as will also the following, raised by Dr Roden, viz., Duke of Edinburgh, Lord Napier, and Sultan.

Among Melons, Golden Queen is a beautifully netted, bright golden skinned, green fleshed variety, of good quality, and Queen Emma is an excellent white fleshed kind. Flavour in melons is, however, a matter very much depending on season and good cultivation.

Amongst Cucumbers, Rollisson's and Paul's Telegraph, Pearson's Long Gun, and Master's Prolific, may be named among the best forms of recent date. Winter Favourite, a hybrid from the hardy ridge sort, promises to be an excellent winter variety, as does also the Early Winter Prolific. To these may be added the magnificent varieties raised and sent out by Mr Hamilton, and Blue Gown, a variety raised by crossing Turner's Favourite with Telegraph. Of this Mr Turner lately shewed some fine specimens at South Kensington ; they measured 26 inches length—were of fine symmetrical shape, goc in flavour, and were awarded a first-class ce tificate.

A first-class certificate was given early th year by the Fruit Committee of the Roy Horticultural Society, to Messrs E. G. He derson, for a very pretty pear-shaped yello Gourd, belonging to the race known in Fran under the name of Coloquinelles.

NEW FLORIST FLOWERS.

SOME of the old florists, who have ardently longed for the return of that time when their favourite flowers shall be once more in the ascendant, may take heart from the fact that Cinerarias are again winning honours, and so suggesting that named varieties are being again sought after. At the meeting of the Floral Committee on the 6th of April, a first-class certificate was awarded to Cineraria Orb of Day, exhibited by Messrs F. & A. Smith, Dulwich; it is a very fine variety, with the florets unusually stout and smooth, of a rich bright rosy crimson, white at the base, forming a narrow circle round the pale disc, and with a thin line of bright deep rose separating the white from the crimson; the colouring of this flower is superb, but it has a tendency to reflex. Messrs Dobson & Sons, Isleworth, had another variety, called Princess Teck; white, with a dark disc, but inclined to coarseness. Other new varieties were shewn, but not requiring special notice.

In the way of new Azaleas, Messrs F. & Smith had Advancer, a taking flower of [illegible] rose [illegible] said [illegible] competent judges [illegible] rose [illegible] ection [illegible] Sons [illegible] very high [illegible] exhibi[illegible] [illegible] truly into bloom [illegible] fimbriata alo[illegible] the single Chinese Prin[illegible] on red stalks, was shewn by Mr B. S. Williams, Holloway; th was not so pure or distinct in character one exhibited by Mr W. Paul a few wee since. The type of flower shewn by M Williams has this season been observed several occasions, and is not so novel as would seem to suppose. There is also a te dency on the part of all white Primulas wi red stalks to come striped or flaked.

A novel and handsome form of Primula cc tusoides amœna, named Lilacina, from Mess Veitch & Sons, has lately received a fir class certificate from the Floral Committe The flowers are pale lilac, and expa much more fully than those of the pal varieties already introduced. Some plan of P. amœna itself, from the gardens of t Royal Horticultural Society at Chiswic were much admired. They were grown 5-inch pots, and were loaded with masses deep rose-coloured flowers, affording anoth illustration of the advantage of a litt "wholesome neglect;" for the plants, whi bloomed so remarkably well, had be allowed to remain in the pots without shift, and had become pot-bound.

[illegible] Rose Prince Leopold, a dark purpl crimson sort, was exhibited by Mr W. Pa [illegible], a climbing variety; some doubt was e pressed as to whether it could be consider [illegible] truly climbing habit, but, at a [illegible] a valuable addition to pill [illegible]

[illegible] delicate pale flesh pink H. P. Ros named Thyra Hammerich, which is said be one of the best of the new ones of la year, and which, though not in good con tion, was full of promise, together with beautifully cupped and globular pale pin ned seedling Rose, were also brought by . Paul.

Butcher, of Cambridge, shewed a fine dged, maroon-ground Auricula, named Butcher, which was awarded a second- certificate; this will probably develop first-class flower.

Turner had a fine lot of new Alpine ulas, especially flowers having maroon- on and plum-coloured grounds; the striking were named Marvel, Charley, r, Stella, and Godfrey, but some account se will be given hereafter.

fancy Pansy, Princess of Wales, from I. Hooper, of Bath, is a bold showy r, with an almost white ground, and regular dark blotches.

alea Thackeray, from Mr Z. Stevens, ham, a cross between Etoile de Gand mperialis, is a deep orange-red flower, having many good properties, but with the edges too much crumpled to give it the desired even outline; being free blooming, of good habit, and of a showy hue of colour, it promises to make an effective exhibition variety, notwithstanding the want of perfect smoothness in the flowers.

A very fine group of seedling Amaryllis was shewn by Mr Baxter, gardener to C. Keiser, Esq., Broxbourne. Three fine varieties of the pale-coloured or vittata series, named Mdlle. Titjiens, Olga, and Alexandria, received each a first-class certificate. They are all bold, finely-shaped flowers, with white bar or margin, and light rosy or carmine-red tints on the segments. One, called Duke of Edinburgh, a rich deep crimson, but rather narrower in the segments, was awarded a second-class certificate.—*R. D., in Florist and Pomologist.*

SURFACE CROPPING VINE BORDERS.

ONSIDERABLE attention has been directed quite recently in several of ontemporaries as to the wisdom or un- m of surface cropping vine borders. It een alleged on the one side that to ate the surface of ground specially pre- to provide nourishment and produce na for a fruit producing plant, so relish- nd piquant to the palates of thousands are in a position to command such a y, is not only bad practice, but so bad lay the supporters, both in practice and y, open to a charge of monomania. The under review argues after this wise:— have now got a most excellent border red for growing grapes. The latest dis- y in the shape of combinations of plastic and the various constituents of which omposed, charcoal, bones, lime rubbish, her bruised oyster shells, have been in- rated, so that both chemically and anically we have created an excellent ck for root development, and for in- g the plant indoors with a constitution s good against anything, certain to ex- prolific and satisfactory return. Of course e fortified our position and prospects with ete as a safeguard against runaways, and means are provided for carrying off waste water. In order that the geothermal condition may not be open to criticism, in destroying the herd of spongioles that teem within that artificial medium, we have introduced quantities of air into drains which communicate with the surface, and keep up a constant circulation, dispensing warmth in its passage, and reloading itself with any moisture that may be accumulated in these underground stores. We have done all this, and yet these vile surface-croppers would unite in asking us to introduce a list of bedding-out plants upon the surface to act as so many thieves upon that choice parcel of land, and thus hasten its destruction."

From the other side we hear evidence of this kind:—"Granted that you have exercised all the skill, the patience, and the perseverance necessary to accomplish a good ground work for grape vine feeding, that your plants are rejoicing under the conditions that you have prepared for them, is it not possible that there may be some ingredients lying unused up in that parcel which the surface croppers might utilize advantageously to themselves, and, probably, have an indirect benefit upon the vine roots? Moreover, instead of the mechanical efficiency of the border being destroyed, as you would lead us to believe, is it not rather likely, from the horizontal and vertical boring of the growing rootlets, going on for the three or four summer months, that it will be rendered even more efficient? and then, it is just possible that some plants, like clover, may leave more nitrogen in the ground than they absorb and carry off; hence, your case of exclusiveness for the vine property alone is anything but conclusive. Again, we insist, if you are to assume an empiric sway, and refuse admittance to either one kind or another of plants upon the bare surface, then you ought to be prepared with some other evidence than that resulting in positives and negatives—positives, when you are dealing with the plea of every plant on its own bit of ground, and negatives, when the theory of agricultural chemistry is indirectly propounded."

The solution of the question is not without difficulty. At first sight, the surface croppers would be in a minority, and, indeed now, if you were to poll the whole gardening fraternity, the balance would greatly preponderate against them. But on calm investigation, it is evident that a proper system of preparation, and the selection of proper articles for surface cropping vine borders can be successfully catered for, simultaneous with vine feeding. It is carried out in some measure more or less throughout the country. In some places, the vine roots have travelled through the prepared ground, to the open quarters where vegetables grow—such, for example, as at Lord Londesboro's, Grimston—and the crops are not only large but good in general respects. Again, at Chiswick, the once great conservatory is doing duty—and splendid duty too—as a vinery, and the vine roots are entwining those of the tree specimens in so close proximity to the building, as to throw shade partially over its surface. One other illustration of a parallel kind; the famous panel borders in front of the houses at Archerfield, are yearly cla[illegible] rs as you mig[illegible] ng lines of th[illegible] ly yet the[illegible] [illegible] scarcely [illegible] quality. [illegible] a variety [illegible] plied [illegible] rative of vi[illegible] owing among [illegible] roots of kitche[illegible] n the fruit tre[illegible] order among fruit tr[illegible] specimens, which [illegible] intensely voracious feeders, and [illegible] ing herd of plants which hav[illegible]

additional attractions during the hot mont of the season.

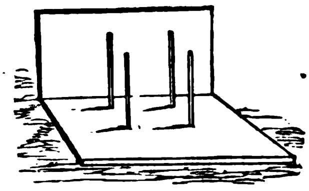
On the other hand, we have some powerf examples of the no-surface cropping pri ciple. First and foremost, Mr Meredith, Garston, guards his artificial borders wit extraordinary care—the more so, as he ha great difficulty in procuring, at any cos material suited to his taste; and every on knows the success that has attended hi cultural achievements in grapes, particularl as regards Black Hamburgs. Mr Fowler, Castle Kennedy, not only guards his borde but mulches it with leaves and manure, as a auxiliary to the strengthening efficacy of th food presented upon the table for vine-feedin and others act equally cautious with the artificial borders. Clearly the tendency the age is to support the no-surface croppin principle.

But the balance of evidence leads directl opposite. It is clearly and unmistakeab shewn that both systems are capable of bein wrought simultaneously. It is only som preconceived notion that generates with the minds of most men—some unaccountab apathy that paralyzes their action in th direction, and ties their hands from engagin in testing the matter, else they mig be more ambitious, if for no other pu pose than helping science. To reduce it a satisfactory test, however, it must be do upon a scientific basis. It may be done, an is done at present throughout the countr we are sorry to say, upon a haphaza principle, every man preparing his bord with his fibry loam, bones, &c., without t slightest knowledge of the chemical co poundings of the soil, or the relation of t mineral to its other constituents—a point high importance in fruit cultivation. T fact of a double crop of roots, so to spea being possible, has tickled the inducti powers of a few, and we may soon have t pleasure of seeing horticulturists profit shortcomings exposed.

The great evil of the day is the growin conceit of gardeners in their achievements the simple art of culture. It is marvelo how much is gulped down by Mr So-and-s because somebody else said "he was a fir rate gardener—a clever fellow." We woul be the last to underrate the members of t profession; they have great responsibiliti and little income, but they will never rai their calling until they raise themselves—improve their intellects, amend their educ tio[illegible] the matter, then, under consideratio has to be learned from the rudiments rds. Agricultural chemistry ought to some degree mastered so as to emr the first gardeners of the day to with authority, to explain in scholar-like what has hitherto been done by signs marks, proving as unsatisfactory as are indefinite. To be sure, most people ell a productive from an unproductive but in a case of this kind, where extraary demands are made and the feeding-l capable of being supplied with a pro of ingredients, why not have them rented, and be able to present a business-ill of fare properly named from top to m. Until this is done scientific gardennowhere. Botany has done much for t nomenclature and relative positions of genera and species, but a knowledge of chemistry is capable of doing what the sister science cannot do. It is more an alphabet for the pure practical gardener, who has mouths to fill and returns to cater for, teaching him what to select and what to avoid, and his returns are bound to increase concurrent with his knowledge thereof. Let gardeners ponder well this matter, and be up and doing, and when they come to discuss the various bearings of such a subject as that calling forth our present remarks, they will be the better able to vindicate their respective positions, by giving quantitive and qualitative analyses of soils. It is important for them to learn what materials are, so to speak, manufactured by the vine roots, and other roots respectively, and what is left in the soil by way of exchange.

ASPARAGUS.

JT with a sharp knife. When it is to be marketed, it must be bunched. engraving shews a simple bunching



The bottom is ten inches wide and inches long; the back, six by twelve, is nailed to it; four sticks, six inches long, are inserted in the bottom, four inches apart each way, beginning two inches from the back. Lay a string upon the board, within sticks, and place the asparagus, previously washed, between the sticks, with the heads against the back board. When sufficient is placed in to form a bunch, tie the string, and cut the butt ends of the asparagus even. Place another string near the top. Bass mat furnishes the best strings. The usual size of the bunch is nine inches long, and four to five inches in diameter. The bundles should always be set erect to keep them straight, and when packed in boxes for market, fresh cut grass should be used below and between them.

*THE PUBLIC NURSERIES OF PARIS.**

its public nurseries Paris possesses a very useful aid which we have not in this ry. With us each park or garden pro- or purchases its own supplies; in all the gardens of the city are furnished its nurseries. It should be observed that in Paris there are two sets of public gardens—those of the city comprising the boulevards, squares, parks, church gardens, and so on, and those of the State, the gardens of the Luxembourg, Tuileries, &c. All are equally open to the public—all arranged with a view to its pleasure and convenience; but in the case of the State gardens each supplies its own stock. What

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m Mr Robinson's admirable work, "The Parks, ades, and Gardens of Paris."

we have to deal with now is the manufactory, so to speak, for the vast array of gardens and open spaces made during recent years. At one time the old State gardens were by far the most important in Paris; now they are quite eclipsed by those created specially for the city and its people, and not merely as the surroundings of a palace or the pleasure-gardens of princes. Considering that the whole is of such recent growth, the success of the arrangements is surprising. In commencing to improve the town by means of public gardens, there can be no doubt that it was a wise step to begin with central nurseries, or plant manufactories, from whence all those gardens could be supplied.

The advantage of having public nurseries of this kind to supply the parks, gardens, and squares of a great city are so great, that it is surprising they have not been already adopted with us. Not only could the necessary trees, shrubs, and flowers be procured much more cheaply, but a far greater selection of choice subjects would be at the disposal of the planters. By selecting ground favourable to each class of plants, shrubs, or trees, the whole of the subjects in that particular section could be grown to as great perfection as by any Nurseryman—could be produced at a far cheaper rate than they could be bought; and the necessity of searching for, bargaining, and selecting would be done away with, the planter having merely to indicate the subjects required. They could be quickly despatched to any given point in vans constructed for the purpose. In addition to these advantages, a small portion of each nursery might be devoted to an experimental ground to test newly introduced or imperfectly known plants; and in this respect each would be of valuable aid, not only to the State, but also to the general public. With our parks and crown lands in which to select positions, the establishment of such gardens would not be expensive, and would in a very few years save the cost of their construction. Our large Nurserymen would feel a pleasure in contributing their novelties and rarities, as they now do to our botanic gardens, and a system of exchange might be arranged between them to the advantage of both public, private, and commercial establishments.

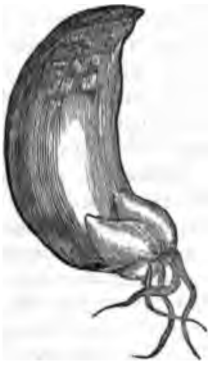
The present system is too bad to last. We have, in and around London and our other great cities, numerous public parks and gardens, and it is to be hoped their numbers will go on increasing from year to year. Let us suppose that the superintendent or designer of a new public park o garden , wants many thousand trees an shrubs for its embellishment. He has t obtain them wherever he can, and as th nurseries are arranged chiefly or solely fo private use, most probably there will b great difficulty in getting some things eve at a high rate. For example, a very important item in town gardening consists of tree for park and avenue planting. If at th present moment we wished to plant a avenue of Plane trees, of suitable size an properly prepared for the purpose, we shoul no doubt have to send to the Continent fo them, as in our own nurseries they are no prepared for street planting; in which cas they would cost much more than if bough in this country, and be in far worse conditio for the purpose than if they had been grown a home. In Paris there is a great central establishment at Passy, where all the tender plants a grown and increased, and there are nurserie specially devoted to the production of ci trees and shrubs, in which the most suitabl kinds are grown, and grown exactly to th size and shape in which they are best suite for being placed on the boulevards, or in th parks or gardens. The cost of each plant tree is in this case a mere trifle; in our ow the plantation of even a very small park, one boulevard, would amount to a very co siderable sum. To pay a guinea apiece f specimens that we could produce for a fe shillings, and a shilling or two each for co mon stuff that we could grow for a fe pence, is to follow a plan whereby o public gardening, and consequently t health and beauty of our cities are conside ably retarded.

The Jardin Fleuriste of the city of Paris situated in the Avenue d'Eylau, close to t Porte de la Muette, leading to the princip promenade of the Bois de Boulogne, a should be seen by every visitor interested eith in public or private gardening. It is the dep for all the tender plants used in the decorati of the parks, gardens, and squares of the cit Entering from the Avenue d'Eylau, the fi objects of interest that meet the eye are c lections of handsome plants growing in t open air on a small lawn amidst the gla houses with which the place is nearly cover My object is not to describe the garden detail, but simply here as elsewhere to poi out its most instructive features. To me t most interesting and valuable group plant on this lawn is a number of hardy Bamboo proving clearly that in our latitudes we may enjoy the peculiar grace and verdure of these giant grasses, and by planting them highly improve the appearance of our gardens and pleasure-grounds, especially in places under the mild influences of the sea and in the west and south of England and Ireland.

On the grass here during the past summer might be seen one of the most magnificent of all pea flowers, Clianthus Dampieri, flowering very freely in the open air, although we find it so difficult to grow even in our greenhouses. It was sown in February, and planted out early in June as a tuft of several plants, isolated on the grass, but rooted in peat soil. The shoots grew to more than 2 feet in length, and began to unfold gorgeous bloom at their apex about the beginning of August, continuing to do so till the commencement of October. As an isolated group upon the grass, I need not say it was very fine; and I believe the same success could be obtained in mild parts of this country, and in many places against the low, warm walls of glass houses, &c. It should be raised as a greenhouse annual, and planted out about the first week in June in peaty soil. Some may not be aware that it is infinitely more beautiful than the old brilliant and popular C. puniceus, though, unlike that, difficult to cultivate and impatient under the most skilful treatment in houses. There are usually many fine groups of Yuccas, Musas, Cannas, various new plants, and other objects of interest on this little lawn which will repay a careful examination. The most remarkable of the novelties of the past season was Dimorphantus manchuricus, a remarkably handsome plant, reminding one of Aralia japonica. A plant of it a few inches high, put out at Passy in July, 1868, had leaves a yard long and 34 inches across by the middle of September. It will prove of the highest value in the ornamental garden.

HOW LILIES ARE PROPAGATED.

THE Japanese Lilies are so hardy, as well as beautiful, that they should become as common as the Turk's Cap and Tiger Lilies. They are now all moderately cheap, and if one only has a bulb or two to start with, the stock may be readily increased. If left to themselves, the bulbs become large clumps by natural subdivision, but this is a slow way of multiplying them. If a lily be taken up in autumn, after the leaves have withered, there will be found upon the stem, just above the old bulb, a mass of small bulbs intermingled with roots. A dozen, and even more, are frequently found. The little bulbs may be removed and planted out separately, or the stem to which they are attached may be cut off just above the old bulb, and set out with the cluster of bulbs and roots attached. They should be covered the first winter with a few inches of litter. The next season they will make strong bulbs. Another method of propagation is from the scales, of which the lily bulb is mostly made up. These scales are attached to a solid portion at the base of the bulb, and they are broken off close to this, it being important to get the very base of the scale. The outer scales of a bulb may be removed without injury to it; indeed the majority of those offered for sale by florists have first been deprived of their outer scales, which makes the bulb look better, and at the same time gives them material for propagating. The scales are set out in an upright position in boxes of sandy compost, pressing them down into it, until the point is about level with the surface. The boxes are to be placed in a room where they will be at about the temperature of 50 deg. or 60 deg., and kept just moist enough to prevent shrivelling. In about two months, a small bulb—sometimes two—will be found



at the base of each scale, as in the prefixed wood-cut. In spring the boxes are plunged in the open ground, and the bulbs allowed to grow all summer; in the following autumn cover them with litter, and the next spring, if too thick, they are to be planted out separately. Another plan is to mix the scales with moss (Sphagnum), such as is used for packing plants, and place them in a box in a warm room. They should not be so dry as to shrivel, nor so moist as to be in danger of rotting.

MARKETING FRUITS—RAILROADS.

THE following letter by a market gardener in Illinois, contains facts quite as applicable to railway management—or rather mismanagement—in England as in America:—

"All business enterprises have their drawbacks. It is pleasant to speak of success, and sometimes easy to write of failures, and blame or censure others if we can charge them with the cause of failure. Ten years ago we began to plant market orchards here, and have planted six on 150 acres of land. In 1865 we shipped from one orchard (eight acres) 1400 boxes of peaches. They sold for a little over one dollar per box in Chicago. When gathering and marketing expenses were paid, there was a little over 700 dollars left; out of this had to come the cost of planting, and care and rent of land. One thousand boxes of this lot were sent to Chicago on the night freight—cost, 97½ cents per 100 pounds. In 1867, from one orchard of seven acres, we shipped 1300 boxes—sold at about one dollar per box. Those went on the fruit train—freight 30 cents per box—1 dollar 50 cents per 100 pounds. After expenses were paid, 496 dollars left. When we commenced planting here, express charg to Chi [illegible] dol. [illegible] his ve [illegible] in the right direction, as many large orchardists had stopped planting. A good crop o fruit, with a fair price, would doubtless giv an impetus to planting. The crop of frui was light in 1868—only about three car load per day were shipped from our station; i 1867, ten car loads per day, and before s many peaches could be handled over and sol a few hundred boxes would unavoidably b left over at the large commission houses i Chicago, to be sold the next day at reduce prices. Somebody's peaches had to be at th bottom of the pile. When we have a gener fruit crop, perhaps one-third of the finest wi supply the market; as much of the other tw thirds as can be handled may be dried—som made into vinegar, the grapes into wine, &c.

We have strong hopes that some of ou railway companies will yet come to the senses, and cease to place a prohibitory tari on the cultivation of fruit for market. should be to their interest to encourage fru culture, as this enhances the value of lan and increases business, the life-blood of rai ways. Carlyle said, in speaking of his ow countrymen, "there are thirty million inhab itants in the United Kingdom, the major pa of whom are fools." We will not say this Railway Directors in general, but many them who aim to live on the general succe of their lines, would seem to render themselv liable to a small portion of Carlyle's censur for the suicidal course of extortion which th mistakenly practise—which either repress business or invites opposition. The tr [illegible]e of all corporations and men wl depend on the custom of others, is to *invi* not drive away business.

MARKET GARDENING IN LONDON AND NEW YORK.

TO supply a population like that of New York, consisting, as it does, of a million inhabitants, daily, throughout the year, with fresh vegetables would, it might be supposed, require an immense tract of land. Such, however, is not the case; for it is doubtful if there are more than 4000 acres devoted to the raising of green vegetable, three-fourths of that extent being occupied by the bulkier articles of maize, peas, and beans. The former crops of early vegetables, such as asparagus, cabbages, cauliflowers, cucumbers, lettuce, onions, radishes, rhubarb, tomatoes, beet, and turnip, being confined to an extent of possibly not more than 1000 acres. This area is occupied by market gardeners in portions of from 5 to 50 acres, the average being about 10 acres to each allotment. It may be added at the outset, that for the cultivation of all kinds of vegetables for profit, the soil should be of the best quality, loam at least 10 inches deep, on a porous subsoil.

Asparagus being a crop that will produce for years without renewal, extra preparation is given to the beds in which it is planted. In America this is done by thoroughly pulverising the soil, trenching it 2 feet deep, and incorporating it throughout with at least 6 inches of well rotted manure. When thus prepared, the beds are lined out 6 feet wide, four rows being planted in each bed, and in length to suit the convenience of the planter. The plants are set 9 inches apart in the rows. A full crop is usually taken the second year after planting. The market value of asparagus is much varied, ranging from $500 to $1000 per acre. But when once planted, it is profitable even at the minimum rate, as there is no expense attending it, except giving it a top-dressing of manure each autumn, which is dug in in the spring, and in keeping the crop clear of weeds.

About London high prices depend much upon earliness; therefore immense quantities of asparagus roots are forced on 2 feet in depth of dung in trenches, having 6 inches of mould to plant in. These are then hooped over, and blanched, in order to make the produce white. The beds are prepared by putting on an immense quantity of manu and trenching the ground 3 or 4 feet dee mixing the manure as the work procee In March the ground is laid out as follow suppose that a fence runs south and north otherwise, 3 feet is allotted between it a the first row. A drill is drawn about 2 inch deep, and the seed, which is saved from t strongest plants, is sown thinly, say 6 inch or 1 foot apart, which gives choice of drawi out the weakest, in order that the permane crop may stand 1 foot apart. The next r is sown 18 inches from the one just me tioned; then for the alley and two sides the bed, 5 feet are allowed; then anoth row of seeds, and so on, which gives two ro to each bed. The first year onions a generally sown all over the ground; t second season lettuce, or any dwarf veg table that will not choke the asparagus, a so on until the third year, when the beds a formed out, and a few inches of mould d out of the alleys, and thrown over the crown only a few, however, of the finest heads a cut this year. In autumn, when the haul is cut, the whole ground is forked over a is planted with cabbage, coleworts, or wint greens; then, in spring, the beds are mould up from 8 to 10 inches deep from the alley The finishing of the cutting must be left the grower. A fair crop of heads must left after four or five weeks cutting, in ord to lay the foundation of heads for next yea growth, by restoring to the roots what h been taken from them in the shape of a cro but not a single head should be allowed grow until cutting is entirely suspende When the haulm becomes ripe, it is cut dow the mould is thrown into the alleys, and the enriched, and the whole of the beds a alleys are planted again with cabbage, green &c. Twenty acres under this kind of cro may not unfrequently be found in one plot.

The kind of beet used for the first crop i America is the Bassano, which is followe by the short-top round. These are sow about the first week in April in rows 18 inch apart, and are thinned out, as soon as the get about 1 inch high, to 5 or 6 inches apa and thoroughly hoed with the prong ho twice, or until the leaves cover the soil. Under this treatment, this crop is marketable about the middle of June, and is sold clear off in two or three weeks at a price varying from 400 to 800 dollars per acre. This it will be understood is a first crop to be followed by celery or other vegetables as a second crop.

About London, beet is in great demand during winter, and therefore growers of it are very particular about the time of sowing it; for one week too soon often spoils it. It is generally put in about the first week in May, and if transplanted, all forked roots are discarded, and great care is taken to preserve the tips of the roots entire, and to keep them from being doubled up in the operation of replanting, which is generally done about a foot apart each way. Dark-coloured beets are most esteemed, and are richer and better than pale varieties. They should be stored in a shed in moderately damp earth, the whole being covered with straw.

Early cabbage or cauliflower, in America, is one of the most profitable of crops, and, consequently, most important. The seed for these (for their culture is in all respects the same) is sown in the open ground from the 15th to the 20th of September, and a month later the plants are planted out in cold frames at a distance of about 2 or 3 inches apart. As cold weather advances, these frames are covered with sashes—not usually, however—before the middle of November, care being taken to expose the plants as much as possible during mild weather. These are planted out between the middle and end of March in rows 2 feet apart, and 16 inches asunder in the row. Between these rows of cabbages or cauliflowers are planted lettuces, which had also been wintered in cold frames. The lettuces are marketable by the middle of May, and the cabbages or caulifl[illegible] the middle of June [illegible] [illegible] [illegible] crop is by [illegible] of cabbage used is the Early W[illegible] somewhat resembles the Winnigsta[illegible] at least a fortnight earlier. The cauliflowers are the Dwarf Erfurt an Early Paris.

About London, cabbages, cauliflower, an broccoli, are most important crops. The see for the general crop of spring cabbages i sown between the 25th of August and th 1st of September, in beds 5 feet wide, whic collectively occupy several acres. Transplanting entirely depends upon the season and how far the ground is cleared of othe crops; but generally the plants are put ou about the end of October on well dunge trenched ground, the planters following th trenchers. Land for cabbages is alway heavily manured, a two-horse load being frequently applied to every 30 feet square. I may be named that slugs are almost unknow in London market gardens, owing, doubtles to the continued trenching which is kept u in them. The plants are never moulded up but the ground between the rows is kep stirred and aerated by means of frequent ho ings for spring cauliflowers. The seed i generally sown about the 20th of Septemb in open beds, and towards November col frames and hooped beds are got ready f them, in which the young plants are pricke out, about 4 inches apart, air being give them on all favourable opportunities. The are planted out in February or beginning March, in the richest and earliest pieces ground that can be found for them. Brocc is sown in May, and is planted out after le tuces or other early crops.

Onions, in America, are raised from "set or small bulbs that have been grown fro seed sown thickly the previous year on po soil, so as to render them as small as possibl These are planted out in spring, as early the ground is fit to work, in beds, in rows inches apart, the sets being 2 inches apart rows, care being taken to keep down weed [illegible] crop of onions thus raised, seldom sells f less than $500 per acre; but very often fetches much more money. They are so [illegible] bunches (eight or ten in each) in a gree [illegible] dried, they come into competiti with [illegible] raised from seed, and thus do n [illegible]thing like so high a rate. This [illegible] cleared off in July, and is follow [illegible] or something else as a second cro [illegible] London, onion seed is sown in t [illegible] of February or beginning of March, [illegible] beds 5 feet wide, the soil from the alle being thrown on to cover the seed. T beds are then raked, and a light wood roller passed over them. Weeds being ke down, the crop seldom fails to be a good one. Salt and soot sown with the crop, help to keep down insects. Another way is to sow in August, and to allow them to stand in beds all winter, afterwards planting out thickly in rows in well-prepared land. A third plan is to plant out all the smallest bulbs in February. Land for onions should be dressed heavily with the very strongest of manure. Onions, about London, is one of the most profitable of crops.

Early radishes, the first of all vegetables in America from the open ground, are easily managed. After the ground has been thoroughly prepared, the seed is sown broadcast, and the crop is fit for gathering usually by the middle of May, or in six weeks after sowing. All the radishes are washed and tied neatly in bunches before they are sent to market. In New York, the average price got for them is about $10 per 1000 bunches. An experienced tyer averages only about that number per day; another hand is required to gather, and a third to wash. Therefore, the labour required by this crop, leaves but a small margin of profit, the gross receipts not being more than $300 per acre. The radish crop is usually succeeded by carrots, parsnips, or long blood beet, for winter use.

About London, radishes are sown broadcast about the close of the year, in as warm a situation as can be got for them. The alleys are marked out, and the soil from them is thrown over the seed, all being made level and smooth. After that, rough stable-dung straw is put over the beds, 2 or 3 inches in thickness. When the plants come up, if the weather is at all fine, the straw is removed during the daytime and put on again at night, till all danger from frost is over. This crop is succeeded by French beans or vegetable marrows.

Rhubarb, like asparagus, requires special preparation of the soil in order to be profitable. The variety which in America is found to realize most money is the Victoria, though the Linnæus is said to be the best flavoured. Rhubarb is increased by division of the roots; it is planted in rows 4 feet apart, and 2½ and 3 feet asunder in the rows. Copious dressings of well-rotted manure should be given early in spring. Rhubarb is a clean, convenient, and safe crop, the sale of which averages 600 dols. per acre.

About London, rhubarb is a favourite with all classes. It is obtained early by placing the roots in trenches on 18 inches in depth of hot dung, on which a little soil is placed for planting purposes, hooping over the crowns, or covering them with some 6 inches of straw. Over the whole are put hurdles or mats, and on the occurrence of severe weather, a covering of straw is superadded. The oldest roots are generally those which are taken up for forcing, and new plantations are made somewhat after the American fashion. The forced plants furnish eyes for successional crops.

Of spinach, the only variety grown in America for market is the winter or prickly, which is sown from the 1st to the 15th of September, in rows a foot apart. In winter it is preserved by a coating of hay or straw. It is marketable in March, and is usually off in time for summer cabbages, onions, or beet. It usually sells for about 500 dols. per acre, but it is said to be usually only a moderately profitable crop, entailing, as it does, considerable expense in picking and getting ready for market.

About London the same variety is put in a little earlier than is done in America; it is sown in beds 5 feet wide, and succeeds best on light deep land, following any crop that may happen to be off the ground at the time of sowing. The price of spinach is generally high, therefore it seldom falls to the lot of poor people.

Horse-radish, in America, is planted between rows of cabbages or cauliflowers, crops which it succeeds. The average weight per acre is four tons, and it realizes 200 dols. per ton, or 800 dols. per acre. It is one of the most profitable and safe of crops.

Horse-radish, about London, is tied into bundles of twelve heads each, or more, for market. It likes a deep moist light soil, but grown on clay renders it hard. When the first crop is off, the ground is then well manured with rotten cow-dung, and the roots are thus encouraged to produce another year's crop. The roast beef of Old England deserves good horse-radish, for which at Christmas there is a brisk demand, and at that season it is generally dear.

Celery, in America, produces from 2 dols. to 3 dols. per 100 heads, and with a dwarf sort, which is grown there, as many as 30,000 heads, and even more, can be had off an acre. It is grown extensively about Philadelphia, Baltimore, and Boston, whence shipments are sent to the markets in New York.

About London, first crops of celery are

sown in February, and late ones in March and April. The first is sown either in a frame or under a hooped roof, with hot dung under it. Celery generally succeeds cauliflowers, cabbages, or lettuces, and being a universal favourite, the supply seldom exceeds the demand.

It may be supposed, from what has been advanced in reference to American market gardens, that the acreage receipts in that country are high, but they are nevertheless realized. They are the result of improved cultivation, accompanied by thorough drainage. Every spring at least 75 tons of well rotted manure per acre is given; or that is alternated with 1200 lbs. of the best Peruvian guano, or 2000 lbs. of crushed bones. Manure, in America, is applied only in sprir that being considered dressing sufficient succession as well as first crops.

About London, higher prices are ev obtained for market garden produce th anywhere else, and here, as in America, t great secret of success is continual dungir trenching, and keeping the land, which well drained, clear of weeds. Pigs, whi London growers keep in large numbers, co vert refuse vegetables into manure, of whi plenty can also be had cheap out of Lond itself. Without manure, our market garden would succeed no better than those in oth quarters. With it and high cultivation, th vegetable crops are enormous in regard bulk—juicy, crisp, and good.

HOW I BECAME A FLORIST.

IN an interesting little pamphlet recently published in New York, under the above title, Mrs Gilman relates her first year's experience in growing flowers—an experience which many may profit by in this country. Left a widow five years ago, she found herself the owner of her house and a garden 75 by 160 feet, but quite at a loss as to any immediate means of securing an income. Wholly by chance she learned something of the market value of the flowers with which her garden fortunately was well stocked, her husband having had much taste for their cultivation as a source of pleasure. But of everything connected with the garden and its management, Mrs Gilman herself confesses to the most complete ignorance. Finding that she could sell the flowers in the neighbouring city, she undertook the task with no little mortification, but fell in with one or two kind and wise advisers who encouraged and assisted her, while her own friends only prophesied failure and ruin. She went on to take, in the best of all schools, that of experience and necessity, the first lessons in the art of flower growing, and proved herself an apt scholar. An insurance of 2000 dollars on her husband's life, gave her the capital necessary to run up and stock a greenhouse, and she was fairly embarked in the business. Of course bad luck came with the good, but with the feeling that everythi depended on care and energy, fewer sli were made than might have been expecte The result is a clear income now of 20 dollars a-year.

The story, of which we give but a ba outline, is told in a simple, concise, a straightforward way, which sustains the reade interest thoroughly from beginning to en Mrs Gilman says:—

> "The consumption of flowers is enormous. T number of greenhouses has more than trebled since built mine; yet to-day the price is higher. I cann think that this will continue. The price will eve tually come down, which will be an advantage alike the grower, seller, and consumer. In such a busine as this, it is not the high price, but the great quanti demanded, that is advantageous to the producer."

Taking this comprehensive view, she in parts the history of her starting, as an e couragement to others, and hoping to aid th "hundreds of women living near our larg cities, eager and willing to do something t add to their slender income." The feelin which her friends manifested at the outse and which she herself appears to have share that there was something rather disgracef in a woman's attempting to cultivate a garde is a relic of old prejudices which some ma be surprised to find still lingering in man minds, but which such books as this are we calculated to destroy.

Arboriculture.

ON THE CEDRUS ATLANTICA.

BY HUGH FRASER.

THE native habitat of the Cedrus Atlantica is on the highest mountains of Barbary, and specially on the Great Atlas range in Northern Africa, where it is found in great abundance at an elevation of from 5000 to 10,000 feet above the level of the sea, and reported as a noble and picturesque tree, attaining a height of from 70 to 100 feet, with a proportionate girth of trunk. Its timber is extensively used, being durable and easily worked, not quite, though nearly equal to that of the Deodar, but very much superior to that of the Cedar of Lebanon.

In leaves and branches it very much resembles the Cedar of Lebanon, but easily distinguished from their silvery appearance, and from the leaves being shorter and denser than the Lebanon; while in general appearance the tree presents a combination of the characteristics of both the other species, having the tall straight tapering habit of the Deodar on the one hand, with the stiff horizontal branches of the Lebanon on the other.

Since its introduction into this country about the year 1845, and particularly during the last 10 or 12 years, it has been largely used in ornamental plantations and shrubberies, and is much appreciated as one of the handsomest of our hardy conifers—its shining silvery foliage and straight symmetrical appearance presenting a striking and pleasing contrast to the darker green of the other plants with which it is usually associated. It has, however, attracted comparatively little attention among practical foresters, as an important addition to their list of hardy useful timber trees. That it is well adapted for this purpose has been amply demonstrated by the experience of the last few yea
which our winters have been as inte
our spring and early autumn frosts
for plants as any in the present cent
subjecting exotics to the most seve
While the Deodar, Araucaria, an
other trees hitherto considered perfec
in this country, were either killed ou
very much damaged, unless shelter
otherwise favourable circumstances
storm of 1860-1, as far as I have be
to ascertain, the Cedrus Atlantica s
no injury whatever. Though the soi
Atlas range is for the most part cal
the rocks being composed of mounta
stone, with occasional dykes of igneo
this tree has proved by no means fa
and is found to thrive in almos
geological formation in this country
ing with equal luxuriance among th
and clays of the *debris* of granite ar
with those of the sandstone system
in the lias and chalk of England, i
with extreme vigour. Generally s
however, nothing suits it better than
rately rich loam with a fair proportio
composed vegetable matter, in a s
neither too dry nor too damp; in short
ever a soil and situation suitable for t
mon spruce fir can be found, I woul
no hesitation in planting the Cedrus At

In selecting young plants for the
there is no better size than from 1½ t
although much larger trees may be r
with perfect safety; and the best sea
planting is spring, as soon as possib
the breaking up of the severe frost of
choosing such weather as will insure
being properly firmed about the roots

being soddened. Like the spruce and Scots fir, little progress in the way of growth may be expected for the first year or two after planting, even in the most favourable circumstances; but when once established the Cedar will shoot up with wonderful rapidity, and, in good situations, rival the larch itself. It may be noticed that although 1845 is given as the date of its first introduction into this country as a distinct species, there are several examples, both in England and Scotland, of trees which must have been planted considerably earlier, and which, from their close resemblance to the Cedar of Lebanon, have been regarded as mere varieties. Their upright habit, glaucous colour, as well as the smaller size of the cones, however, prove their identity with the African species beyond any reasonable doubt; and it is quite likely that small quantities of seeds may have been imported into private establishments, as its native mountains have been long well know and accessible to travellers. Among the be examples of such trees, and proving the adaptability as a British timber tree, are son in the extensive park of Belvoir Castl Lincolnshire, the seat of the Duke of Ru land. On a recent visit to that plac Mr James Parker, the intelligent hea forester, shewed me several noble spec mens, one of which I procured the dimensior of: height 60 feet, stem at 1 foot from th ground, 7 feet 4 inches in circumference, an the spread or diameter of the branches 4 feet. The other specimens have straight stem but in this, the largest, the trunk branch off at 6 feet from the ground, into two uprig stems, the one an almost exact counterpart the other, and presenting the appearance c two fine trees growing side by side. In th autumn of 1868 there were upwards of 5 cones on this tree full of seeds and nearly rip

THE MOST ECONOMIC USES OF CHIPS, BRANCHES, AND ROOTS OF TREES.

BY JAMES JOHNSTON, WEST VALLEYFIELD, CULROSS.

THERE can be no doubt that economy in all ages has been studied, and to some extent practised, but it will be admitted that the command, "Gather up the fragments that nothing be lost," has never been more strictly obeyed than in our own present and enlightened time.

It has long ago ceas[illegible] wonde[illegible] hear of and [illegible] the streets [illegible] into brick [illegible] ities con[illegible] ul occa[illegible] ertile pla[illegible] converted [illegible] agents [illegible] agri[illegible] grass, [illegible] pape[illegible] rag merchants real[illegible] fortunes from the thrifty housewife's economy bag. He separates his heterogeneous collection and disposes of it at handsome profits. To the paper-maker h deals out his share of the convertibles; to th bottle maker his; to the bone merchant hi and last, but not least, the tweed manufactur his share of semi-rotten fabrics of clothin that once kept us warm and comfortable ami winter's frosts and snows, to be again co rted into warranted fast tweeds, from th finest wool! These, and innumerable oth things of comparatively little value, are dai converted into useful commodities, and a [illegible]ed to economic purposes.

Notwithstanding the enormous amount [illegible] agricultural produce annually consumed i [illegible] there yet remains considerabl [illegible] such produce, either lost or u[illegible]ntably employed, comprising chip branches, roots, as the residue of thinnings plantations, clearing of matured crop or the reclaiming of woodlands; these a others the economist has either hither neglected or failed to discover any qua ties in them sufficient to recommend them f mical purposes. The writer does not me to possess the inventive genius sary to solve the question, or hold out to interested the hope that he can devise neans or point out any source of uni- l consumpt or economic application; from his experience in districts where thing in the form of arboricultural pro- has not only been economically applied, intimately acquainted with persons who risen from humble life to ostensible ons and wealth, from trading in what we efuse of woods and plantations. Any ledge possessed by the writer on the ct, he thinks, would be best conveyed rendered most acceptable to those ested, if submitted in the form of a re- embracing the operations carried on in orest where he acquired his experience.

– P— the property of his Grace the Duke — is situated in the county of N—, parish —, distant from a railway 4 to 8 miles, water carriage 3 to 6 miles. Com- d within an area of 12 miles are towns and a few populous villages, contributed in no small degree to the mpt of the produce in question. In , when the writer entered upon his e, the forest referred to contained acres under a crop of coppice and r, which was termed the coppice forest, comprised every description of the luous class of timber trees. Under the r grew coppice of every description, n as coppice plants, also 200 acres lantations, chiefly mixed hardwood arch, the latter predominant, and from to forty-five years of age—in all, 1100 of wood in one mass, divided into een sections, varying from forty-five xty acres each. Now it must be borne nd, that there are three distinct crops ioned here, namely, coppice, timber, and ations. To be still more plain and understood, I will give the particulars ch separately and consecutively.

ppice, which was the first clearing for eason, was cut, and disposed of in lots enty poles each. It was sold by public n the month of December, and stipulated all cleared off by April, for the sake of ak timber, which was afterwards to be The coppice fall averaged 50 acres per m; from age, thinness of stools, coarse- of quality, there was consequently a amount of refuse fell from it. Imme- ly after the sale, the wood-merchants, were the principal purchasers, overhauled their lots, and selected all the produce adapted to their special trades, then disposed of the refuse to the faggot merchants, who cleared the land as they went. What was fit for pea boughs and bean stakes was dressed, and tied into bundles (with withes made from small clean rods) 4 feet in circumference, and laid into lots of fifty each. The remainder were tied into faggots, also 4 feet in circumference, and 4 feet long, and laid also in lots. The average cost of making was 4s. per hundred; value in the wood, 10s. per hundred; purchase and making generally amounted to 6s. 6d. per hundred, leaving a balance or profit of 3s. 6d. A considerable quantity of this refuse is disposed of to farmers and bakers, who cart it home themselves for heating their ovens with, preferring it to coal as being cleaner and cheaper; but the faggot merchant, who keeps horses of his own for the trade, preferred the hawking of this refuse to the towns and villages, disposing of it at 4s. 6d. per score; pea and bean stakes, 3d. per bundle. He then loads coal put up in bags, and hawks that on his homeward journey, or disposes of it the next day at home, and loads faggots again for town; others again who do not trade in coal, contract for stone carting for roads near to their round and in this way carry on a brisk trade, earning a good livelihood for themselves. By these means considerable sums are realized for refuse that would, to a great extent, remain upon the ground worse than useless.

Considerable orders for faggots were executed in this forest, and consigned by water carriage 31 miles to Lynn Regis in Norfolk, for the reclamation of land from the sea; they had to be made from smooth wood (no thorns) 6 feet long, 12 inches in circumference, tied tightly with withes 18 inches from each end; average cost of purchase and making 30s.; total cost per thousand delivered at Lynn Regis, 50s. They were pegged down in layers on the sands at low water, the returning tide covering them in time with various sorts of deposit, which eventually was converted into valuable land.

Faggots, also, by the million, went to railways that were being made in the marshes of L—— and C——, for foundations for the embankments and roadway in general; purchase and making averaged 9s. per hundred, being made of all sorts of rough refuse, and tied without dressing. To these purposes was the chief part of 600 acres of coppice, varying from three to sixteen years of age, applied; and reckoning from the demand keeping steady, we must conclude that such refuse answered the purpose, and was economically applied.

The cut of oak timber, which averaged yearly 10,000 cubic feet, followed the coppice cut, the chief part of which was cut with the axe; consequently, a great quantity of chips fell from it, which were collected into heaps at the root of each tree after it was cut, and left there for the present. After the removal of the bark the dressing of the timber commenced, the chips and short pieces of wood that fell from it were, together with the felling chips, collected into heaps with a large skip, four of which made a cart-load, and valued in the wood at 5s. per heap. The chief part of this refuse was purchased by farmers and trades people, and stored past for winter fuel. After the timber merchants had overhauled the tops, taken out fencing-posts, and crooks for boat-building, they then sold the remainder to the faggot merchants, who tied them into faggots, and disposed of them much in the same way, and for similar purposes, as the coppice refuse. In this instance they had 6d. per hundred to pay for withes, which, with purchase and making, stood them on the average 10s. per hundred; value in the wood 14s., but at public sales we have seen them realize 24s. per hundred. In July we had from three to four hundred lime and poplar trees to cut, for the spoon and toy trades, which were carried on near to the forest. The refuse of those trees was the worst to dispose of. We had to turn faggot merchants ourselves, and sell them to farmers for forming stack bottoms. After they served that purpose, they were used for oven fuel. This sort of refuse seldom realised any more than 8s. per hundred. In December we commenced cutting the ash, elm, beech, sycamore, maple, service, and chestnut timber which averaged yearly 6000 cubic feet [illegible] chips and [illegible] pared [illegible] same man[illegible] disposed [illegible] ing [illegible] Ever[illegible] hardwood [illegible] prunings [illegible] prepare [illegible] was [illegible] hedgerow [illegible]wood, being remarkably heavy, produced [illegible]oo faggots, which we made ourselves; also collected the chips, and sold all by public auction. Being near to good roads the faggots realised on the average 16s. p hundred, chips 7s. per heap.

A great competition was carried on b tween the faggot merchants and the charco burners, who bought extensively of the to wood of deciduous trees, trimming off a the branches down to 1 inch in diamete and stacking them in convenient places f charring in the forest. The twigs were gen rally given to the faggoters, who worke them in along with heavier refuse.

The continued practice of felling the co pice and thinning the timber crop every 1 years, had so reduced the standard crop the forest, that in 1862 his grace's agen considered it necessary either to replant reclaim it for cultivation. It was decid to reclaim 600 acres, and replant t 100 lying next to the previous-mention plantation part, which would still form a fore of 500 acres. We accordingly received orde to make arrangements for reclaiming 1 acres per annum, taking 50 acres of you coppice and 50 acres of matured coppi each year. It would be out of our provin to introduce here any particulars save tho relating to the subject—namely, the applicati of the roots, &c., which fell from the grubbi or reclaiming of the woodlands. The purpos to which they were applied, and the metho of application, we consider essential. Let it s fice to say, that on the 29th July 1862, t first sod was turned for the demolition of forest that had at one time formed part of R—— Forest, where the deer had for ages roam at their liberty, disturbed only by the spor man perched aloft in the buck-headed tre formed for the purpose of watching his gam and where the Roman warriors had rested, f their flocks, and pursued their industri evidences of which were found, such as spea bells that had fallen from the necks of catt and ovens for burning pottery. After we h the first section of 50 acres grubbed, t quantity of roots was fearful to look upo [illegible] the root that had produced 150 cub [illegible] timber to that of the hazel, the land w [illegible] covered. A considerable quantity [illegible] roots was sold at 12s. per waggo [illegible] about 2 tons), but the supply quite ove [illegible] demand in this instance; we, [illegible] red a portion of small roots [illegible] large ones with, which was t cheapest mode of disposing of them, a which we took advantage of, and burned lar quantities of earth or turf as it was turn over with the spade. This mixture of wo

and burned earth was spread upon the
efore the seed-sower, and harrowed in
with the seed, which resulted most pro-
. The crops that had a liberal dress-
eraged fully 15s. per acre more at the
sales. Seeing that draining would
to be carried out extensively, and the
e of tiles from a distance would aug-
the expenses very much, we conceived
heme of burning bricks and tiles with
. After a trial, which resulted satisfac-
, we erected a wooden shed to accommo-
a portable steam-engine, a pug mill with
s and dies attached, also a circular saw
, placing them so for the engine to work both
taneously. The purpose of the saw was
t up fencing for enclosing purposes, also
wood to supply the engine in place of
The kiln, together with brickfield in-
nsables, was erected, but only in a tem-
y way, in order to finish the undertaking.
short description of a kiln heated with
instead of coal may be acceptable.
vould recommend a 20,000-kiln—*i.e.*, a
constructed to hold that quantity of
s. When this size is not sufficiently
, two had better be made. The fierce-
with which wood burns necessitates the
ng of the kiln at least 8 feet below the
ce of the ground. This is required to
fy the draught, which is the primary
in a wood-burning kiln. A kiln of this
requires three fire-holes, open on one
only, but passing through the whole
of the kiln. To give facility for charging
ires, the holes should not be less than
ches high by 24 inches wide. They
ld be carried out 7 feet from the side of
iln, the top of their arches loaded with
and buttressed against the side of the
This extension is necessary to prevent
ame from passing through the flues, and
ng in contact with the ware in the kiln.
flues require to be smaller and more in-
e than those of coal-burning kilns, for
same purpose of sheltering the ware,
fying the draught, and distributing the
in a regular manner.
e process of drying the ware in the kiln,
ratory to burning, must be performed
great caution. The unsteadiness with
wood burns presents a difficulty of
aining a uniform but increasing degree
t, to bring the ware to that state to stand
olume of burning heat. That state is
ted by the decrease of steam evaporat-
om the ware, which gradually assumes
lour of smoke. As soon as this becomes
est, the burning process may be commenced. The wood for the drying process should be thoroughly dry, otherwise it is apt to convey moisture into the ware, cause a lingering process, and deteriorated ware. The roots of the ash, elm, maple, and hazel are well adapted for this purpose. They contain very little moisture, and a much steadier heat can be conveyed from them. After the drying process is completed, any other sort of wood may be used that can be put into the holes; all sorts of branches made into small faggots, about 18 inches diameter, answer very well for burning 2-inch draining tiles. All ware of heavier make requires stronger wood, applied either by itself or along with faggots. In stoking the fires, there should always be a supply of large roots at hand to roll into the mouth of the holes after charging them. This restrains the draught, and serves the purpose of making the roots less, so as they can be pushed further in at the next charge; and they likewise generate a strong and steady heat, almost equal to coal. It is also necessary to have pieces of sheet iron to hang on the mouth of the holes to prevent the escape of heat. It will require about twenty hours continuous burning to attain the essential heat; but this, in some cases, may be only an approximation, for all clays will not stand the same degree of heat, therefore do not require the same time; but this time is indicated by a white heat, which is the highest attainable degree, and which this clay required to produce good sound ware.

It will also be necessary to give a statement of the cost of applying this refuse to the purpose above mentioned; and, in doing so, it will be well to place the cost of applying coal against that of wood. It must be understood, however, that we put no commercial value upon the refuse, putting the clearing of the land, and any trifle that accrued from it, as its value; also that coal delivered in the forest would have cost 16s. per ton; also that the kiln being a 35,000 one, and much too large for burning with wood, a greater saving would have been effected with the size previously mentioned; also that it required 10 tons of coal to burn 35,000 bricks in other kilns situated in the district.

WOOD.

1500 faggots, making and carting	£2	12	6
40 cart-loads roots	2	0	0
Cost of application	2	0	0
35,000 ...	£6	12	6
Cost per 1000	0	3	9¼

COAL.

10 tons coal, 16/		£8 0 0
Cost of application		1 0 0
	35,000 ...	£9 0 0
Cost per 1000		0 5 1½

The annual produce of the brick-fields averaged 140,000 draining tiles, and 100,000 building bricks, which were used for building farm steadings. The small balance of 1s. 4d. per 1000 in favour of the wood, together with 3s. per acre saved in the clearing of the land, was considered sufficient to warrant the application of such refuse to that purpose, but it would have resulted much more profitably with two 22,000-kilns instead of a 35,000 one.

Branches, roots, and chips, we have seen applied to the burning of clay into material for roads, garden walks, court-yards, or, in fact, any purpose that stone in a broken state is applied to; but, of course, it is not so durable. In clay districts, where stone cannot be obtained but at an enormous cost, it is a good substitute. In the summer of 1865 the writer passed over 30 miles of roads, newly formed, in the parish of G—— G——, county of N——, that were formed entirely of the above material. Stone in that locality being a scarce commodity, it is quite a common thing to see a well 100 feet deep dug in fine blue clay. Part of the above material was burned with coal, and part with plantation thinnings, and we could see no difference in the quality of the material, but with this exception, that there were more ashes in that which had been burnt with wood. The method of burning clay is much the same as burning limestone in open kilns—a layer of fuel and a layer of clay is placed alternately. It can be produced in that way from 7d. to 1s. per cubic yard. To make a good sound road, it should be screened, or bar shovels used to lift it with. To produce a first-class material, even preferable to some stone, we recommend the burning of clay in kilns such as are used to burn tiles or bricks; and in districts where clay is abundant and stone scarce, and wood of any description considered valueless at hand, the cost of building a kiln is a trifle compared with the cost of getting stone, or the loss incurred by having bad roads. The screenings or ashes falling from this material are valuable for applying to nurseries or gardens situated on wet clayey soils.

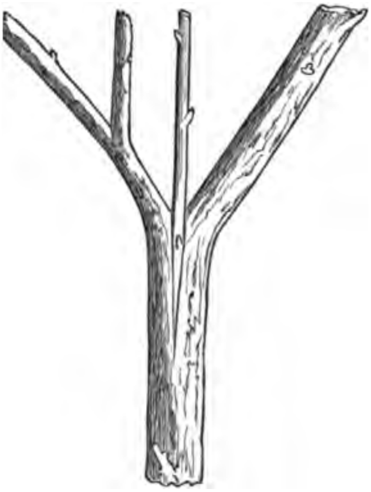
We will draw these brief remarks to a close by placing in contrast the sources consumpt for these sorts of refuse peculiar Scotland with those of England. The gr bulk of refuse falling from arboricultural p duce in Scotland is of that nature (the pi tribe) that it would not meet with such rea and profitable sales in England; yet it wou all be consumed, and its value obtaine Assuming, however, that the refuse in Sc land was wholly that of deciduous trees, would have little effect upon the consum in bringing it to a par with that of Englan To make this more clear, it will be necessa to make a few statements as to the sources consumpt. The steady, and we may s unlimited, demand for this refuse in Englan proceeds chiefly from the householde demand for fuel. Some may be induced say, that fuel is as necessary to, and is co sumed in Scotland, as well as England. Th we admit; but it must be borne in mind th the population of England is much great than that of Scotland; also, that the cu toms of the one country are very different fro the other, which is the chief cause of th universal consumpt. The population England is congregated more into villages an towns; the agriculturist does not enjoy th privilege of having accommodation on hi farm for his servants; he does not engag them for his work on the same terms as agr culturists do in Scotland. The English far labourer receives his wages in monthly, for nightly, or weekly payments in money. H has a house to find for himself in som village contiguous to the farm he is employe upon. He does not enjoy the privilege his northern brethern, of having a house an fuel found him as part of his wages; but i obliged to purchase everything that goes int his house at, what we may say, exorbitan prices. The faggot and coal merchant is a essential to him as the butcher or baker; an the threepenny faggot and shilling bag coal must be reckoned in the week's suppl of household essentials. Enormous quanti ties of faggots and chips are consumed i towns by well-paid artisans and trades people. We see no difficulty in organizin and carrying out the same system wit similar results in Scotland, more especiall upon estates lying near to large towns, an we are fully convinced that the system woul be most acceptable and appreciated by th inhabitants of those towns, and, at the sam time, clear plantations of refuse otherwis generating disease, and a temptation t e to trespass in woods, which is a most rable nuisance.

every county in England where we have he opportunity of getting any know- upon the subject, the faggot trade was me, and similar prices realized; but it l be a fruitless attempt to try to dispose se branches, either at public sales or by e bargain to private consumers. The plan of getting rid of such refuse is, to dispose of it loose and wholesale e faggot merchants, or have it made d retail the faggots, which is the most ble. In many instances, the profit d defrays the cost of cutting the timber, and, wherever carried on, on either plan, a book should be kept exclusively for it to enter all particulars therein.

We have in various places in this report digressed widely from the subject in question, but this digression was mainly to point out where such refuse fell from, also the quantity of it, method of preparing it for sale, the source of consumpt, and manner of disposing of it, or applying it to any of the purposes mentioned, in which we have had sufficient experience to be able to testify that the application of such refuse to those purposes can be successfully carried out, and also that it is economical.

A NEW METHOD OF GRAFTING FRUIT TREES.

HE readers of horticultural publications are aware that M. A. Boisselot, of s (France), is the inventor of a very method of grafting the vine, which is ert the graft in the fork between two hes, as shewn by the engraving. The tage of this mode of grafting the vine en generally recognized, but no one fore thought of applying it to other and M. Boisselot himself was not aware great service he rendered to horticul- when he published his invention. I applied it to a great variety of trees, but pally to the pear, to experiment with varieties of pears which I receive in great number every year. Before I knew of Boisselot's system I could not make use of a great number of the grafts I received, not being willing to sacrifice the trees that were yielding me yearly a quantity of fruit; the old system of cleft-grafting necessitating the mutilation of the whole tree, or at least its principal branches. During the last two years I have grafted every variety of pears I have received (and at any time of the year), according to the Boisselot system. The grafts have grown like the other branches of the trees, and some of them bore fruit last year. I can thus keep my old trees until I find that the new sorts are preferable to the old ones, and most likely I shall not be obliged to cut them down, as several sorts of pears can very well live and prosper together on the same tree. I have thus increased my enjoyment. This method is, of course, not very practicable on large trees, but is principally useful for small gardens where espaliers and dwarfs are grown, to take up less space. By this method, with a limited number of trees, a great many varieties of fruit can be grown. It can also be usefully employed for experimenting with seedlings that shew signs of excellence. It must be understood that no part of the branches between which the grafts are inserted is to be cut back; therefore no mutilation of any part of the old trees is necessary, as is the case in cleft-grafting.



Boisselot's Graft.

The engraving shews the graft as inserted: it is to be tied, and the junction covered with grafting-wax, or waxed cloth, in the usual manner.—*Jean Sisley, Lyons, France.*

TIN LABELS FOR TREES.

AFTER many years trial, we find nothing so cheap, simple, convenient and durable, as strips of sheet tin, for permanent labels on fruit-bearing trees. They may be seven or eight inches long, an inch or so wide at the larger end, and tapering nearly to a point at the other. Neither the breadth nor length requires accuracy. They are cut out of scrap tin, and may be made at the rate of 5s. per thousand, or at a less cost. To write the name, lay the label on a table or board, and make the letters with the point of an awl or of a file ground to a short point, pressing firmly while writing. Each label is placed on the side limb of the tree, by ben ing the smaller end once or once and a ha round it. The work is then done—in le time than the reader has occupied in readin these directions. Nothing further is nece sary for many years. The point used f writing the letters scrapes away the tin coa ing, and admits the moisture of rain to th iron, rusting it and rendering the letters co spicuous. As the limb increases in size, th tin yields to the pressure, and never cuts th bark, and is at the same time stiff enough t hold on and prevent the label being move by the wind, which so often defaces and wea out other labels. Out of some hundred made and put on trees about eight years ag all are now distinctly legible and in the places, and most of them appear likely t last at least eight or ten years more. Th woodcut is an accurate representation of o of these old labels.

Easter Beurre.

The Stable.

THE ANTIQUITY OF HORSE-SHOEING.

WHILST preparing some notes for publication on this subject, we have been favoured with a programme, issued by the Directors of the Scottish Society for the Prevention of Cruelty to Animals, for the award of three prizes, amounting together to £100, for essays on horse-shoeing. (See p. 274.) We are happy to perceive, from the spirit and expressed outline set forth in that programme, that anything we may continue to advance on the important subject is not likely to prove unacceptable, or in any way operate against the working, for good, of the Directors' plan, of which we will take brief notice here.

The measure appears like the introduction of a *wedge*, which will require to be steadily pressed home; it is, in fact, a distinct measure to meet an urgent requirement of technical education; and if its early fruits be no more than the discrimination of the real state of the subject, that will not be a trifle.

Notions were extensively promulgated in the early part of this century, which are now popularly entertained, that horse-shoeing was not adopted until some centuries had elapsed after the inauguration of the Christian era; and that the art was first established in this country, in the eleventh century. For the origin of these surmises, we search in vain. To the late Professor Coleman, and Mr Bracy Clark, is due the diffusion of these ideas, the first by lectures, and the last through his writings, though there were, as we shall hereafter shew, discrepancies of opinion among a few learned men of the last century on the question; but none to warrant the dogmatic teaching and general conclusions adopted. Turning from the technical teaching of half a century and more ago, to the conservators of records of the present day, we find the question to stand thus, treating of horses and horse-sho ing :—"Solomon had 40,000 stalls of horse for his chariots, and 12,000 horsemen." B. 1014. 1st Kings, chap. iv. ver. 26. ("Dictio ary of Dates" by Joseph Haydon, 1861 This author continues, "In the nint century horses were only shod in the time frost. The practice of shoeing was intr duced into England by William I., 1066. Of the above sentences, one only is vouche for in any way to claim credit. And tha passage from the Bible stands in contrast to th other sentences, they being, moreover, withou corroboration or reason to sustain them. W must claim indulgence for dwelling on a poi to which we know only few readers wi attach importance; but it is our belief tha no art can rise to a high standard, of whos history its followers are indifferent and i *error*—quite different, be it remarked, fro ignorance. It is from due appreciation of th past that future steps can be most successfull taken.

That which stops the inquirer, and lead him to refuse to listen to such tales as those the horse being late subjugated by ma hence the late adoption of shoeing and othe measures for his cultivation and preservatio while the best possible evidence, which tell us that the reverse was the state of fact hinders learning. The passage from th Bible adduced by Haydon would alon refute all such assumption as we have allude to; but, if needed, many more passages fro the sacred volume may be quoted, as the often have been, to shew that in the earlie ages of the world the horse and the mule, a well as the ox and the ass, were appropriate for use in great numbers. The horse is fir spoken of as consisting of the animals whic formed the property of the Israelites in th book of Genisis, "and Joseph gave them bread in exchange for horses, and for the flocks, and for the cattle of the herds, and for the asses" —Genesis, chap. xlvii., 17th verse. Again as to the services rendered by horses in those times, we read, in the fourteenth chapter of Exodus, that Pharaoh "made ready his chariot, and he took six hundred chosen chariots of Egypt. . . . And the children of Israel went out with a high hand. But the Egyptians pressed after them, all the horses and chariots of Pharaoh, and his horsemen."

Mules, as well as horses, are spoken of with the kind of services they respectively render under ordinary circumstances. In the 2d Book of Kings, chap. v. 9th verse, "So Naaman came with his horses and with his chariot, and stood before the house of Elisha." 17th verse, "And Naaman said, shall there not then, I pray thee, be given to thy servant two mules' burden of earth?"

We shall not make further quotations which could be done from the same sacred volume. What we want to shew is the inconsistency of men, in sustaining dogmas which have neither facts nor probability to rest on. We have seen that horses were used hundreds and thousands, certainly, almost three thousand years, and probably much mor before the period when it is alleged th shoeing was first adopted. And adopte only "in the time of frost" above all oth times, a time when horses are least employe and when they can best go without shoe Then, where were the shoers to be found f that frosty weather? The absurdity of the ide of extemporising men for emergencies, to pu into execution feats of skill, of which th elaborators of those flights of fancy could hav no notion, is not worthy of attention, unle proofs were shewn.

We are not going to assert that among th arts and sciences cultivated by the Druids o England, horse-shoeing was one, but at lea the contrary is beyond proof. Neither ca we understand how, in the absence of ev dence to the contrary, it has been inferre that the people who built the pyramids, an gave laws and learning to posterity, shoul have been either so incapable or inhumar as not to staunch the bleeding of a horse foot, and have taken time and means to he the wound, and for the restoration of stru tures, or that they should not have adopte protective means which, when tried, woul have proved preventive also.

HORSE SHOEING.

THE Scottish Society for the Prevention of Cruelty to Animals have struck out quite a new path for themselves by the offer of prizes, amounting to £100, for essays on the best mode of shoeing horses. A great deal has been written about the structure of the horse's hoof, and the best means of preserving it, and treating it when suffering from disease. Innumerable, also, have been the essays, some of great practical value, which have been published on the very important subject of shoeing; but spite of all that has been written, we believe that, *as the* [illegible] hoof is treated at the present [illegible] modification, precisely in the [illegible] was treated and shod a [illegible] ignorance and apathy go hand in hand in this matter. The prizes offered by this Society will no doubt be tl means of eliciting a great deal of valuab information; and after the adjudication the essays the next step to take will be devise some plan by which farriers will induced to adopt such improved modes shoeing as the writers of the essays may poi out, and which in practice may be foun capable of universal adoption.

The points to which the Society direct tl attention of competitors are very clear stated in a series of "hints" issued by the of which the following are extracts:—

1. Suppose a horse sound and hitherto unsho describe the present method of preparing the hoof f shoeing, the amount of horn taken away, and t instruments employed, so as to bring the whole natu bearing surface in contact with the ground.
2. Can you suggest anything better?

3. How would you prepare the shoes (fore and hind) for various kinds of horses, as *race-horses, hunters, hacks, coach, cab, 'bus, and heavy-draught horses.*

4. In describing the forging of shoes (whether hand or machine made), state, very exactly, the number, relative positions, and *direction* of the nail holes, and give reasons therefor.

5. Describe the best manner of fitting the shoe, and give your opinion as to the propriety of applying it in a *heated* state, in order to secure an equal bearing; and whether that can be obtained *without burning* into th hoof.

6. Point out any evils or abuses in existing system of horse-shoeing.

7. Suggest any improvements in the form, materia or mode of fitting shoes.

8. How may the hoofs of horses be best preserved

9. Give any suggestions as to how a thoroughl scientific knowledge of the horse's foot might best t acquired by horse shoers.

ON THE ACTION OF THE HORSE.

BY JOSEPH GAMGEE, SEN.

ALMOST any work published in this century which treats in any way on the locomotive powers of the horse, would supply me with a quotable passage to shew the requirement of more being said on the matter. I trust, however, to the facts which I hope to establish, and the importance of the subject, as affording the best reasons I can give for breaking in somewhat abruptly upon this question.

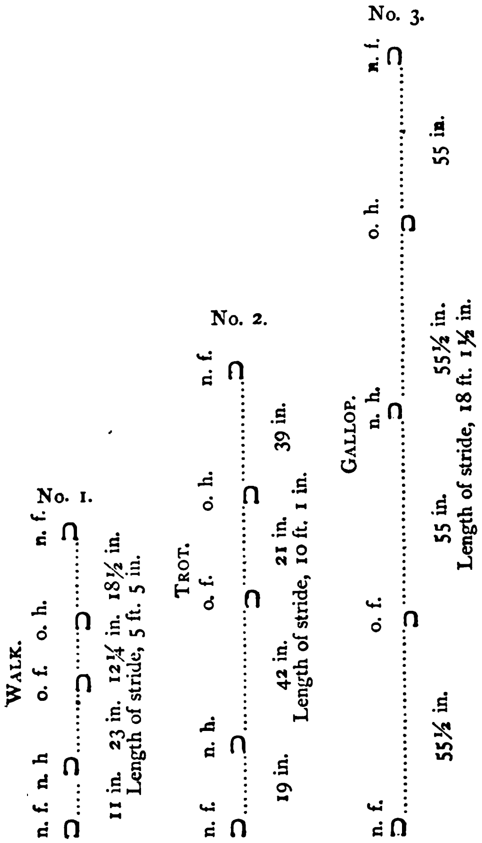
In the *Times* of 16th February 1869, an anonymous correspondent wrote under the heading, " The Turf and Breed of Horses," and said, " In our day a horse is considered strong if he clears 15 or 16 feet in his first bound. If he covers a greater space, he is considered to be of superior strength. But Flying Childers cleared at each bound 25 feet, and as from his compact form those wonderful strides would follow each other in quick succession, the laws of motion lead us to conclude that no horse of this day could live with him."

Here the writer displays mistakes, not entirely of his own making, but which have been handed down to our generation and that of our fathers for the last eighty years.

The doctrine that horses bound, or spring through space in their fast actions, is a delusion which originated, as far as I have been able to trace it, with Sainbel, and bequeathed to us in his " Essay on the Proportions of Eclipse," in which he says (illustrating the text with a profusion of figures and diagrams), "that the gallop consists of a repetition of bounds, or leaps, more or less high, and more or less extended, in proportion to the strength and lightness of the animal;" further, he says that "Eclipse covered 25 feet at each action." And thus was the wisdom of 3000 years, as it came down through Xenophon and Borelli set aside.

I have had to deplore the transmission of this false teaching to us, becaus it has vitiated the theoretical and practical knowledge of horsemen, professiona and amateurs, on questions the mos important to be rightly understood. Fo at least half of the forty-five years that hav passed since I entered on the practice o the veterinary art, I was under the thraldo of that dogma, the influence of which in its extensions perplexed physiologists of the highes rank, who, regarding the horse as the typica exponent of animal locomotion, refer to i comparatively in the belief that what is accepted by all, has been established on soun premises. Finding at length that the prevalent theory of the action of the horse was unintelligible, that it did not accord with practical observations, and that it was absurd, had recourse to experiments and systemati observation, to the aid of which I brought m anatomical knowledge, and made efforts t improve and increase it.

During several years horses of differen breeds were examined under varying conditions, as well as dogs, of which some belonged to the less fleet varieties, whilst other were greyhounds of coursing notoriety; an the results which I obtained by observation on these quadrupeds were checked, an extended by others on the walking, running, and jumping of man. I arrived at th conclusion that the horse does not boun off the ground in the gallop, nor in any othe pace, and that the bound or leap is altogethe a distinct action, only occurring for the purpose of accomplishing what the regular pace cannot possibly effect. In the fast paces, a in the slow movement, the horse has never less than two of his feet acting on the ground; and further, when the animal is in action no two of the four feet are in similar positions, or acted on in like manner, at the same instant. In the leap or bound the gallop is interrupted, and a new order of movements set up, which as they require a great concentration and expenditure of power, and are only designed for emergencies, cannot be frequently repeated.



The results of my inquiries on the gallop ill be better comprehended by referring to he prefixed illustration, the third in particular, hich was appended to one of my papers on he subject, published in the *Journal* of the Royal Agricultural Society for 1863—(On the Breeding of Hunters and Roadsters—prize ssay). This diagram exhibits five positions n the ground, drawn to a scale of the feet of a wo-year-old colt in training, which had been galloped over the ground for the purpose. My object was to find out the exact distance h ugh which each foot was carried from the

place where it was lifted to that where alighted.

Looking at such a diagram we find tha the marks of the four feet appear simply in continuous line. If we measure the distanc between two successive impressions produce say of the near fore foot, we find it to b 18 feet 1½ inch. Midway between thes two impressions is the mark of the near hin foot, which therefore subdivides the spac into 9 feet 6-8ths of an inch, but each c these is again subdivided into halves tw by the impressions produced by the o fore and off hind feet. It is thus see that the horse's body instead of being pr pelled through the air by bounds or leap even when going at the highest attainabl speed, acts on a system of levers, the mea distance between the points of resistance which is 4 feet 6 inches. When the groun has been galloped over, an ordinary observ will barely distinguish between the line imprints made by the feet of the near fro those of the off side, so nearly do these appe to lie in the same straight line; indeed tape may be so stetched that it will cut fo an indefinite distance the inner sections the footmarks of both sides of the bod The exact length of stride, of course, onl applies to that of the particular horse ob served, and the rate of speed at which he wa going. In the case of any one animal, th greater the speed the longer is the individu stride. In progression, the body moves befo a limb is raised from the ground, as is mo readily seen when the horse is beginning i slowest action; an opportunity for testin this fact may be found at most railwa stations, where powerful horses are kept f drawing heavily laden trucks.

When one of these horses is attache to the carriages he walks to the exte his traces admit, and applies his should to the collar; no effect following, th noble animal prepares for the required orde by planting his feet in position, flexing h limbs, and then plying his vast force equal upon all four feet, keeping up the strain un the resistance is overcome; when, both bo and burden moving, the feet are shifted, fi one fore, then its diagonal hind, and thirdly t opposite fore and its diagonal hind, and th if the load follows, the walk is established.

Mistakes have been made in attributi undue range and effect to the extension the limbs, in determining the length of stri To prove this question no other animal is well suited, or so controllable for the test, as man himself. If we observe a person starting into a walk, it is found that the first foot raised moves over a distance of 2 to 3 feet, and that the opposite one, moving secondly, passes over double that distance, and if the pace be kept up and the person be a fairly good walker, 6 feet will be the average length of each stride, and the half that, the measure of every step; and if the pace be changed from a walk to a fast run, these distances of stride and step respectively, will be found to be about 10 feet and 5. A proof of the limit of extension may be obtained as follows:—Let a man stand, keeping his body and head erect, and his feet in parallel positions, and request him to extend one foot, the utmost extent will only reach about 20 inches before the vertical line of the body; and now requesting that the foot be set on the ground, no other change of position being made, it will be found that *that* foot will come back to almost a parallel position with the other, and that no extension of the limb, tending to progression, has happened, or is compatible with inaction of the body; thus proving that the limbs are carried from the one position to the other with the body, and not extended away from it.

In the movements of the horse, comprised in three natural paces, calling respectively for different degrees of energy, and accomplishing relative degrees of speed, we find, according to observations taken, that in the walk 5 feet 5 inches are covered by each foot in their respective movements, in order; 10 feet 1 inch in the trot; and 18 feet 1½ inch in the gallop.

In the first of these paces, 3 feet are in constant action on the ground in the slowest move; but in the free walk, as represented, in which the hind foot passes the position from which the parallel fore moves, there is a fraction of time when only two feet are upon the ground, but the interval is too short for the eye to measure it. The proportion of time, therefore, during which the feet are acted on upon the ground, to that occupied in their removal to new positions, is as three to one in the slow, and a fraction less in the fast walk. In the fast gallop these proportions are as five to three. In all the paces the power of the horse is being exerted mainly upon a fore and hind limb with the feet implanted in diagonal positions, at a distance apart in this fast action of one step, *i. e.*, 4½ feet. There is also a constant parallel line of positions kept up by a for and hind foot, alternating sides in each successive move. The fore foot begins and th hind terminates the action by its toe wit extended limb becoming the fulcrum, at distance from its parallel fore of less tha 9 feet; and as the hind is set free whe the vertical line from the hip-joint is passed the fore foot ready in position becomes th new stay.

It must be borne in mind that in contemplating length of strides, with referenc to the fulcra, allowance has to be made fo the length of the feet, which is to be deducted from that of the strides, becaus the apex, or toe of the horse's hind foo forms the fulcrum in one instant, and th heel of the fore foot in the next, and *vic versa.* This phenomenon is very obvious i the action of the human foot, and is remarkable also for the range of leverage thu afforded in some of the fleetest quadruped of different species. In the hare, for instance, between the point of its hoc and the termination of its extended digits there is a space of upwards of 6 inches o extent of leverage and variation of fulcrum and in the fore limb from the *carpus* to th toe-nails (whose function in progression i not to be underrated), upwards of 3 inche of leverage are found, being about 10 inche for each lateral biped, and the double of tha for the action of all four feet. Viewed i this way, the stride is not really as long a would be supposed if merely estimated fron the space between the footprints.

These relative positions are renewed an maintained thus:—Each fore limb assumes as it alights, the advanced position paralle with the hind just released and moving; th hind feet moves by turns, in sequence t their diagonal fore and in priority to thei parallel fellows, which following they maintain for nearly half their course, when th fore in its turn is raised and carried to it destined place, the hind alighting midway a stated. All the feet passing over equal distance and keeping the same time, no interference of one with another occurs, and eac successive hind foot, as it is implanted, form a new diagonal with the opposite fore, th latter forming the front of the parallel in on instant, and one of the diagonal positions i the next; while in the case of the hind, the assume the diagonal on alighting, and becom the terminators of the parallel in the las part of their action.

Many interesting remarks might be mad

on the length of the stride of various animals; the full movement of the greyhound is, for instance, upwards of 16 feet; that of the hare at least equal; whilst that of a Newfoundland dog is a little over 9 feet.

Power to carry weight and fleetness of action are, to a great extent, distinct and incompatible phenomena in horses, determine chiefly by their construction, muscular energ determining the extent of speed within th possible limits; the speed acquired dete mines the length of stride, and therefor length of stride is the effect and evidence speed, and not the cause of it.

ROUGH LEAVES FROM THE NOTE-BOOK OF A VETERINAR SURGEON.

CHAPTER XIV.

PREGNANCY AND PARTURITION.

THE diseases attending pregnancy and parturition are not numerous; at the same time, unfortunately, the most prevalent are the least under our control. As we proceed, we will endeavour to give a few simple, but we hope efficient, hints as to prevention of the same. These may be classed as abortion, or slinking the calf; false or unnatural presentation; puerperal or milk fever, or dropping after calving; garget, or inflammation of the udder; and a species of red water.

As regards the time when breeding should commence, I am happy to say that breeders in general are not now in the habit of putting the heifer so early to the bull as they were formerly. No doubt the custom of doing so when she was only a year old, perhaps a little under or over, prevents the full development both of mother and progeny. They find, therefore, that the little extra expense in keep is amply repaid by allowing them to run till two or two and a-half years; and from what I have observed, I must decidedly say that no heifer should be allo[illegible] [illegible]le until she is two years old—and [illegible] better if somewhat later [illegible] [illegible] high [illegible] pend[illegible] on the [illegible] calf [illegible] [illegible] against [illegible] [illegible] ing heifer [illegible] danger [illegible] than [illegible] result [illegible]

The usual time of pregnancy is generally [illegible] weeks, but may be at times a week or [illegible] earlier or later. I need not make any remarks as regards the treatment durin pregnancy, further than urge the necessity, far as possible, of preventing the animal fro being run or knocked about by the oth cows, or a hasty-tempered cowman, so as prevent abortion, and for the same reas the state of the bowels should be careful looked to, and if rather constipated or loos with an unhealthy smell, a dose of phys should at once be given, as a want of d attention to these matters is frequently a pr lific cause of abortion. The premonito symptoms are generally as follows:—T animal looks very dull, coat staring, ba arched, head hanging down, not inclined feed, avoids the others, standing or lying herself in some quiet corner, rumination n very regular, if in milk, partial suppressio or one time a fair quantity, next time le breathing rather accelerated, also the puls the digestive organs will be out of ord either constipation or sharp diarrhœa will present, more frequently the former, a generally staling frequently, or rather campi herself often but voiding little; there is al a discharge from the vagina, and hangi from the vagina to the tail, of a dark whi [illegible]ous, sometimes streaked with blood; occasional shivering is sometimes prese When these symptoms begin to appear, s ought to be at once separated from the re [illegible] placed in a large airy, roomy box or shed herself, and, if at all possible, away from wh any of the other cows are in the way of passi The next thing to be done is to administe full dose of physic, and narrowly exami the state of the pulse, heat of the mou ears, and horns, and the breathing. If pulse and breathing is accelerated, the mo and horns hotter than natural, blood must drawn, from 4 to 6 quarts. When the physic operated, give one of the fever powders, a to which is added the extract hyoscyamus and the liquor ammonia acetate, given daily for a few days, keeping the animal as quiet as possible, giving boiled food, &c. After all your care in the way of prevention, if abortion takes place the fœtus should be buried deep and away from the grazing ground, and not even dragged there over any way where the cows go near, for it is astonishing how susceptible they are of the least smell attaching to anything from an aborted cow. Should the placenta or afterbirth, or cleansing as it is generally termed, not be discharged when the fœtus is dropped, I would not advise it being removed by manual assistance; but, in order to facilitate its discharge and allay the unpleasant smell, inject gently, three times a-day, per vagina, a pipeful or two of warm water, in which is dissolved a little chloride of lime, giving a gentle pull now and then as the cow strains to expel the injection. When the placenta is discharged, it should be buried in the same manner as the fœtus, and quick or chloride of lime placed above it, and well covered up.

After the animal is quite convalescent, the walls, manger, &c., of the shed or box, should be well white-washed with quick-lime or chloride, and the same sprinkled over the manure before removal, and even then it should be placed away out of the reach or smell of the others. It sometimes occurs in an early stage of the pregnancy, that the fœtus dies and comes away in small pieces, or is discharged as a nasty thick and gritty matter, and of a very offensive smell, the animal should be separated directly from the others as above. A full dose of physic given, liberal feeding on boiled food, &c., according to the season of the year, use the injection as above; keeping the digestive organs regular by an occasional dose of physic, and which will also have a tendency of preventing fever to any great extent. A cow that has once aborted should not again be put to the bull, but made ready for the butcher as soon as possible, for it is but seldom that animals which have aborted ever go the full time; and, unless of a very valuable breed, are not worth the risk and loss of time; but if it is necessary to make the trial, the greatest precautions ought to be taken as regards being kept as quiet as possible, and over-feeding being guarded against, and *vice versa*, being too low kept, an occasional dose of physic being given, and even the abstraction of blood may be necessary. The above precautions are also very requisite in animals
that are very fat during pregnancy, and in wh
abortion may not have occurred by the w
of prevention, more especially if with a first ca

Cows in calf should be very closely watch
if placed on a second crop of clover,
which from over-eating too quickly or greedi
are very apt to have fever, an attack of whi
is almost sure to produce abortion.

CHAPTER XV.

PUERPERAL FEVER, MILK FEVER, DROPPIN AFTER CALVING.

The latter are terms illustrating the tw
most prominent symptoms, especially t
latter. Puerperal fever is acute inflamm
tory fever consequent on the great excit
ment attending calving, which may ha
been coming on for some time previous
calving taking place, especially if the anim
is in high condition, or been too much p
upon the forcing system a few weeks befo
her time is up, in the mistaken idea of pr
paring and strengthening the animal for t
change and weakness attending calving. Ha
however, the animal been narrowly watche
it would have been observed that s
did not feed so well as usual, with t
same relish, nor partake of the sam
quantity, feeding heartily for a day or tw
then falling off for another day or two, n
seem so lively; that the udder was sudden
increasing in size, and getting very hot an
tender on pressure, with a too early and i
ordinate secretion of milk. That the dro
pings (the evacuations) were different, n
being discharged at once in a mass, but
short frequent times or intervals, and whe
falling on the ground a thin black crust woul
be formed to break or crack, and the ma
spread around very hot, but healthy in a
pearance. At the same time, if closel
examined, would be found to have
very unhealthy smell. The ears and hor
would be found hotter than usual, an
the muzzle, at one time a nice cool, health
dew on it, another time dry and hot; and th
pulse, that unerring guide to the experience
fingers, will be found to vary likewis
Calving takes place, and in a short tim
after the calf is attended to, on the ne
visit to the cow, she is found very restles
the breathing and pulse is much quickene
nose dry and hot, ears and horns very ho
the head tossed about a good deal, th
action of the bowels stopped, or, perhap
only small quantities, or portions of ha
small lumps floating in some thinner, covere
with a nasty glazy streaking mucous, an

having a very nasty smell. The secretion of milk is partially stopped, at least not much can be got away, and that little with a deal of trouble; in a short time the animal is down or dropped, and cannot be got up; no milk can be drawn away, only, perhaps, a whitish watery serum; eyes bloodshot, full, staring wild; knocking her head about; most alarming moaning, and the breathing very much shortened, catching, or laboured, and all the symptoms of acute inflammatory fever, which soon ends in death.

Treatment.—In the first place let me give a hint as to the premonitory symptoms as described previous to calving, which no one having cattle ought to overlook. Or if observed, ten to one that, instead of judicious treatment, recourse is had to that of a very opposite nature, something nourishing, *i. e.*, stimulating, being given, both in medicine and food. The state of the pulse and bowels are the principal signs to look to; but to the inexperienced, the former, I may safely say, is not much of a guide; but the temperature of the mouth, nose, or muzzle, horns, appearance of the conjunctive or white of the eye are safe and sure guides as to the state of the circulation. If the mouth and nose be hot and dry, horns and ears hot, the eye bloodshot more or less, the breathing quickened, udder distended, hot and tender when pressed, bleeding is here requisite. No fear need be had as to after results, as I have known many to object on the ground of weakening the animal, making her calve before her time, &c. These are fallacious ignorant objections. Let the bleeding be a full one, say 4 to 6 quarts, according to the size, condition, and force of symptoms, following this up with a full dose of physic, bran mashes—no hay. If the first dose of physic has not had the desired effect, follow up with a second, and if the udder is much distended, apply fomentations and draw the teats; but if these symptoms are allowed to pass unattended to, and the treatment likewise, until the cow [illegible] [illegible]ed, or perhaps that detestable nourishing system, as it is called, has been adopted [illegible] the tug of war. Suppose [illegible] [illegible]d, and in a few hours after t[illegible] symptoms as before described are presen[illegible] before she is down, let bleeding be don[illegible] to the full extent the system will bear [illegible] attendant is well up and experienced [illegible] the state of the pulse at this stage of the disease be found regular its beats, but much quickened, or may see full under the finger, or, it may be, small an hard, such a state indicates bleeding, an largely, to the extent of from 6 to 1 quarts, according to condition, state breathing, or even till she staggers. The follow up with full doses of physic, givin quarter or half doses every six or eight hou until the bowels are thoroughly opene Perhaps these earlier symptoms have bee allowed to pass without proper treatmen and often have I known it the case, an instead, the infernal nourishing or cordi drink has been given, hastening on the i flammation, until the animal is down, and t all appearance great debility is present; stil the animal carries her head straight, the ey wild and staring, breathing heavily, occasionally moaning, making efforts to get u but cannot, and all help is of no avail t her.

The pulse, at this stage, will be found ver small, hard, and very much quickened; blee ing is here again necessary, and to the sam extent as before, only when about 5 or quarts are taken, apply the fingers to th pulse, and if it seems to falter, get irregula stop bleeding. Follow up with the full dose physic, with the addition of 15 to 20 drops croton oil, applying externally, from the to of the neck, along the back to the loins, equ parts of strongest ammonia, (liq. ammo fort.), turpentine and oil, spreading above mustard cataplasm, made with boiling stron vinegar. Six hours after, if the bowels a not opened, give a full dose of physi omitting the oil; in twelve hours the bowels are still torpid, half dose of th physic, and half of oil, continuing with ha or quarter doses every six hours, hornin down plenty of gruel, and assisting, by th use of clysters or injection, until the bowe are opened; and when once that begins take place you may then look forward to th recovery of the animal. After the bowels a well opened the appetite may be gone, very much impaired, but do not be in great hurry to increase it by giving cordial Plenty of thick boiled gruel, a handful sweet hay at intervals, coaxing the animal, it were. In a few days, when all appearan of inflammation and fever is gone, you m give of gentian and ginger half-an-ounce each in a pint of ale in some gruel, or in so strong camomile tea.

The Dairy and Poultry-Yard.

HARD MILKING COWS.

In almost all herds of cows will be found some animals whose milk is drawn with a great and painful expenditure of muscle when no disposition to hold up is manifest. The cause is generally found in a defective formation of the teats, the milk ducts being obstructed or contracted. A correspondent of the *New England Homestead* states that he had a valuable young cow that milked so hard from hind teats as to make the operation slow and very fatiguing to the milker. He adds :—" By the aid of a probe, I ascertained that the obstruction was at the lower end of the teat; I therefore thought a little surgical skill might remove the evil. I took a very narrow-bladed knife, gave it a keen edge, took the teat in my left hand, inserted the point very gently into the milk passage, and then, without fear, or trembling, gave a sudden thrust of the knife in the right direction, and the cure was effected. The cow started a little, and then stood still. A few drops of blood followed the cut only. I then operated on the other teat with the same result. Another young cow that came of the above-mentioned, had lost one-quarter of her bag, and milked so hard from one teat that the stream of milk was no larger than a small knitting-needle. With the same success I operated upon that. They milked afterwards as easily as any one could desire, and no leaking of the milk followed."

And in a recent number of the *Albany Cultivator*, Mr Woodward gives a description of the method employed by him with success. He is now milking six cows that underwent the operation from one to eleven years ago—two of them in three teats—and has also cured two or three cows that had been dried in a single teat each, from one to three years previous.

These knots are quite often so fine that they pass being detected by many dairymen who should be practical or scientific enough to cure them. They say it is a confirmed case of garget and no cure, and a valuable cow goes to the shambles at no small sacrifice. This trouble almost invariably happens to the deepest milkers, from three to five years old. This is the *modus operandi* of the operation :—

I simply kill and cure these knots by cutting and milking. I manufacture my own probes from steel wire (clock pendulum size) ; the blade portion is 1 inch long and ⅛ of an inch wide, fleame-pointed. These knots, on dissection, often exhibit a tenacity in muscle next in hardness to bone. Adjust your straps to the cow's legs, and gently lay her down on a nice soft bed of hay or straw which has been previously prepared. Now, the operator can proceed by taki the knot between the thumb and fore-finger of the l hand, letting your hold be above the knot of the te and passing the probe into the aperture in the end the teat up to the knot.

" *Now mind what you are about.* Shove the bla of the probe into and through the knot, which dc not in the majority of cases require more than half t blade's length. Now simply split this knot each w from the edges of the probe blade. Remember tl the knot is simply a contraction of the inner lining the cow's teat, and don't you get so excited as to cu hole right through the side of the teat, or allow yc probe possibly to pass your thumb and finger enou to touch the lower extremity of the udder. If y cut to an extreme at either of the last two me tioned points, you will lose your case and get beat by inflammation.

" I have performed twenty-five successful opei tions in the last ten years, without perceptibly drawi blood, which tells me that there is no necessity f inflammation by simply cutting these knots.

" Perform this operation within twenty-four hou after the cow has dropped her calf, if possible. Nev allow the calf to suck after the operation. The mc milk the cow gives the easier to effect the cure. Tl cutting process simply assists nature to perform natural requirements, and you will also see the nece sity of milking so as still further to assist nature. L your thumb and finger press quickly on the udder little above the aperture you have made, which w assist the force of the milk through, and cause expansion of the inner lining of the teat, which w take away the knot in a measure ; and at the droppi of the next calf you will not be able to tell, from mil ing, which teat was pierced, if well performed.

" Further operations must be performed the same the first. There can be no time specified definitel this must be governed by the operator or milke You must not expect the teat to milk as well for son time as it does immediately at the operation. If the te stops tight in twenty-four or forty-eight hours, ' for it again.' Do not throw up the sponge unle you are satisfactorily defeated. The most obstina case I ever had was last spring, one year ago. Tl cow had three teats under operation ; one knot r ceived six cuttings before it surrendered amicably. was about seven weeks mastering this case. Th cow dropped her calf about six weeks ago, and milking all right from all four."

HOW TO FATTEN A CALF WITHOUT NEW MILK.

A WRITER in the *Rural New Yorker* says:—It has usually been thought impracticable to fatten a calf properly without giving him milk fresh from the cow. But this is one of those errors very common among farmers. Milk is the best type of food for the young animal, because it possesses all the constituents necessary to build up every part of its system, and in the most soluble and digestible condition. Now, any food containing the requisite constituents, in a soluble condition, easily given in a liquid state, may be substituted for the new milk. Hay tea is sometimes used to bring up a calf. This is the soluble constituents of the hay obtained by cooking.

But the best food to fatten a calf, without whole milk, is oil meal, molasses and skim milk for the first two weeks, after which a little oat or barleymeal may be added. We have often made calves weigh 120 to 140 lb. at four weeks old on this food. We have one now that weighs 125 lb. at that age, never having had any new milk after the second day. Molasses may, perhaps, be considered a new food for this purpose, but, when fully understood, must be regarded as an important one. It is very soluble and easily assimilated by the young animal. Liebig is of opinion that starchy food is first converted into sugar before being assimilated by the animal. We all know how rapidly sugar enters into the circulation of the system. Sugar is found to take the place of animal fats in cold climates in keeping up the heat of the body. It may be considered as a substitute for the oil of the milk used in making butter. Oil meal is rich in muscle-forming food and phosphates with some remaining oil. Its constituents are mostly soluble and easily assimilated as food. Oil meal should be scalded, and allowed to form a thick mucilage before being mixed with the skimmed milk. The molasses may be added directly to the milk, and the whole should be blood warm when given. The proper quantity for a young calf is a table-spoonful of oil and meal and the same of molasses, divided into three parts, for one day's feed, added to the refuse milk. At the end of the first week each may be increased, and at ten days a spoonful of molasses and the same of oil meal may be given at each feed. At the commencement of the third week a spoonful of oat or barley meal may be added to each feed, but this should be cooked. This food, together with the skimmed milk of the mother, will make an excellent calf for the butcher at five weeks old. Now the whole expense of this extra food is not more than one-tenth of the value of the butter made from the milk saved. At present prices it will cost less than 1 dol. for five weeks; and an early calf of the weight mentioned will bring from 10 to 14 dols. The molasses may be of the cheapest sort, but there is none better than sorghum for this purpose.

PLOUGHED POULTRY YARDS.

IT is a well-known fact that Americans pay as much attention to the rearing and breeding of poultry as any nation in the world. Every year, during the summer months, large numbers of American breeders come over to Europe, and after ransacking the best yards throughout the Continent, with the view to buy up the best specimens, call in this country on their way homewards, and frequently purchase birds which they cannot find equalled in any other part of Europe. It seems strange that after having passed [illegible] departments [illegible] [illegible] fraction of w[illegible] shorthorn[illegible] [illegible]le, we would [illegible] to accomplish greater improvements i[illegible]eds of poultry and remove to a greater distance than we at present form the limit to the size of our birds. Unless this is done we may expect soon to see our American friends send us across the Atlantic specimens of their breeding, compared with which our "first prize" poultry would [illegible] to the wall." The Americans all us [illegible] pure blood and good type and all they want is the high excellence; that, we may rest assured, they will soon possess.

The poultry column in all the American papers has always a large number of correspondents, and there is no doubt that the animated discussions which often take place in this department does much to bring about greater improvements every day. At the same time there are many quaint ideas that find their way into those columns, the practical value of which we doubt very much, but which may have, to a certain extent [illegible] our own use. Of this, at any rate, we are sure, that every man has a right to inform his neighbours—and by what means better than in the periodicals?—the ways and means he employs to carry out certain ends which, in his own particular case, may have proved [illegible]s.

In the *Albany Cultivator*, lately, a correspondent writing on the subject of poultry, gives an account of some experiments tried by an old acquaintance of his, in poultry raising. He says:—"I took it into my head at one time that to raise poultry you should only *cultivate* them—till them like a crop. And so I ploughed up my poultry-yard and kept it mellow. The fowls took great delight in helping me, for they scratched and dug for worms and insects most assiduously.

fed them on dough made of wheat bran, some corn meal and greens, mustard and horseweeds, cooked together. The fowls throve under that treatment, but unfortunately for my profits, an enterprising 'bird fancier' stole the most of my stock of chickens while I was away from home.

"The next year I ploughed up the yard and sowed a patch of oats in it very thick. The chickens got a good deal of it before it came up, but some grew; and I thought it did much good by affording a place for insects to collect. The fowls, especially the young chicks, would go about in the oats and seemed to be very busily engaged catching flies, bugs, &c. My neighbours laughed at me for raising oats in my poultry yard, but I had a good 'crop' of chickens and no sickness among them. I kept no account of the expense of cultivating my patch, and followed the same plan several years until I sold my farm.

"I have been in poultry yards," said he, "where the fowls were so crowded that the weeds and grass would not grow much, but the ground was foul and stank. The best way I know of to clean such yards, is to turn over the ground with the spade or plough. My neighbours laugh at me when I tell them to cultivate their poultry yards, but I notice that those who allow their poultry the run of ploughed fields, have the healthiest chickens."

That is the substance of the old man's account of his experience. There is, no doubt, some truth in his observations, but we very much doubt if the labour and expense involved by this method, would allow of a very profitable return.

TEACHING YOUNG CALVES TO DRINK.

S. V. VANFLEET in the *Albany Cultivator*, some time ago, gave a description of his mode for teaching young calves to drink. As it is quite an original idea, and one which certainly looks like success, we have much pleasure in subjoining it :—"I think I have discovered a new and much easier and better mode of teaching young calves to drink than any of the old ways practised by my father and neighbours in the olden time, and by most people at the present.

"My practice is to take the calf from the cow at the end of twenty-four hours, and fasten it with about six feet of rope in a box stall; I then milk the cow, and standing off just far enough for the calf to reach me, I wet my finger with milk, put it in its mouth, and gently lower my hand until it is immersed in the milk in the pail—let it continue to have the finger until I have given it enough. This I call lesson No. 1. The second lesson is given in this wise: Dip the finger in the milk and place it in its mouth, and when you have brought its mouth in contact with the feed, gradually withdraw your finger and the thing is done. It may be necessary to repeat this at the third time. The secret is that you must stand just far enough so that the calf can just reach the pail of feed, as the rope will then be taut, and hence he cannot reach you or butt over and spill his milk or feed. I have practised this for a number of years, and have had no trouble to teach calves to drink.

The Country Gentlewoman.

PRACTICAL HOUSEHOLD DETAILS CONNECTED WITH COOKERY.

BY THE LATE MRS PARKES.

MARKETING.

THE directions contained in the present chapter, are intended more particularly for the instructing of cooks and persons employed to market; and they ought not to be considered as unimportant, since novices in marketing and cooking must seek instruction in aid of inexperience.

RULES FOR MARKETING.

In marketing, the first rule is to purchase chiefly from known and respectable tradespeople, who are likely to go themselves to the best markets, and who have to support the character of their shops.

The second rule to be observed is that of not purchasing inferior articles under the idea of being economical.

A bargain is seldom a prize; and this is especially the case in regard to butcher's meat.

The best meat and the prime parts are unquestionably the cheapest in the end, although the first cost may be the greatest. In coarse and inferior joints there is always too great a proportion of gristle, bone, and hard meat to render them truly economic; these may serve as the basis of soups, gravies, or stews; but for roasting or boiling they are wasteful.

The criteria of bad meat, by which must be understood meat that has been too long killed, or meat from animals killed in a state of disease, ought to be well known by those who market, no less than the value and economy of the different parts and joints.

JOINTS AND PARTS OF BUTCHER'S MEAT ENUMERATED.

The bullock is divided in the shambles as marked in fig. 1. The joints are not here given in the order in which they are estimated as prime or as inferior parts:—1. Sirloin; 2. Rump; 3. Edgebone; 4. Buttock; 5. Mouse buttock; 6. Veiny parts; 7. Thick flank; 8. Thin flank; 9. Leg; 10. Fore ribs; 11. Middle ribs; 12. Chuck ribs; 13. Leg of mutton piece; 14. Brisket; 15. Clod; 16. Sticking piece; 17. Shin; 18. Cheek. Besides these parts there are—the tongue, palate, sweetbreads, kidneys, skirts, and tripe. A baron of beef, now an obsolete joint, consisted of the two sirloins undivided.

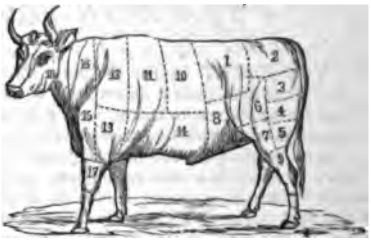


Fig. 1.

The calf (see fig. 2.) is divided into—1. Loin (kidney end); 2. Loin (chump end); 3. Fillet; 4. Hind knuckle; 5. Fore knuckle; 6. Neck (best end); 7. Scragg; 8. Blade bone; 9. Breast (best end); 10. Brisket; 11. Head. To these joints must be added, the Pluck, which includes the liver, lights, heart; sweetbreads, of which one is called the throat

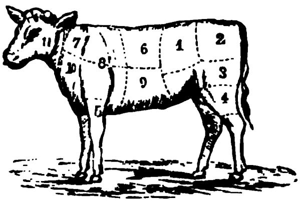


Fig. 2.

read, and is the largest of the two, the
he windpipe sweetbread.
p, fig. 3.—1. Leg; 2. Loin (best end);

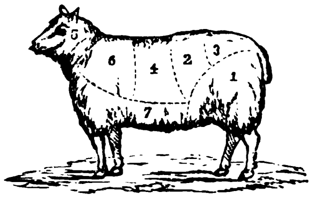


Fig. 3.

ımp end of the loin; 4. Neck (best
5. Scragg; 6. Shoulder; 7. Breast. The
ot separated form what is termed the
of mutton.
lamb is usually divided into four parts,
fore and hind quarters. Each fore
consists of a shoulder, with part of
ck and breast. Each hind quarter
s of a leg and loin. By the target of
s meant the ribs, when the shoulder is
ed from them.
lamb's head is generally sold with the
enances; in which last are compre-
l the liver, lights, heart, suet, and

fry of the lamb contains lambstones,
reads, and skirts, with a part of the

hog (see fig. 4).—1. Spare-rib; 2.

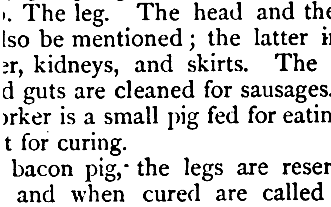


Fig. 4.

; 3. Spring; 4. Fore loin; 5. Hind
. The leg. The head and the haslet
lso be mentioned; the latter includes
er, kidneys, and skirts. The chitter-
d guts are cleaned for sausages.
rker is a small pig fed for eating fresh,
t for curing.
bacon pig, the legs are reserved for
and when cured are called hams;
he shoulder blade and bones are sepa-
om the meat and cured, it is called
The bones, with part of the meat
them, are divided into spare-ribs, gris-
d chines.

CHOICE OF MEAT, FISH, AND POULTRY.

Beef.—The grain of ox beef, when good, is loose, the meat red, and the fat inclining to yellow. Cow beef, on the contrary, has a closer grain, a whiter fat, but meat scarcely as red as that of ox beef. Inferior beef, which is meat obtained from ill-fed animals, or from those which had become too old for food, may be known by a hard skinny fat, a dark red lean, and, in old animals, a line of a horny texture running through the meat of the ribs. When meat pressed by the finger rises up quickly, it may be considered as that of an animal which was in its prime; when the dent made by pressure returns slowly, or remains visible, the animal had probably passed its prime, and the meat consequently must be of inferior quality.

Veal should be delicately white, though it is often juicy and well flavoured when rather dark in colour. Butchers, it is said, bleed calves purposely before killing them, with a view to make the flesh white; but this also makes it dry and flavourless. On examining the loin, if the fat enveloping the kidney be white and firm-looking, the meat will probably be prime and recently killed. Veal will not keep as long as older meat, especially in hot or damp weather; when going, the fat becomes soft and moist, the meat flabby and spotted, and somewhat porous like sponge. Large over-grown veal is inferior to small, delicate, yet fat veal. The fillet of a cow calf is known by the udder attached to it, and by the softness of the skin; it is preferable to the veal of a bull calf.

Mutton.—The meat should be firm and close in grain, and red in colour, the fat white and firm. Mutton is in its prime when the sheep is about five years old, though it is often killed much younger. If too young, the flesh feels tender when pinched; if too old, on being pinched it wrinkles up, and so remains. In young mutton, the fat readily separates; in old, it is held together by strings of skin.

In sheep diseased of the rot, the flesh is very pale-coloured, the fat inclining to yellow, the meat appears loose from the bone. and if squeezed, drops of water ooze out from the grains; after cooking, the meat drops clean away from the bones.

Wether mutton is preferred to that of the ewe; it may be known by the lump of fat on the inside of the thigh.

Lamb.—This meat will not keep long after it is killed. The large vein in the neck is bluish in colour when the fore quarter is fresh, green when becoming stale. In the hind quarter, if not recently killed, the fat of the kidney will have a slight smell, and the knuckle will have lost its firmness.

Pork.—When good, the rind is thin, smooth, and cool to the touch; when changing, from being too long killed, it becomes flaccid and clammy. Enlarged glands, called kernels, in the fat, are marks of an ill-fed or diseased pig.

Bacon should have a thin rind, and the fat should be firm and tinged red by the curing; the flesh should be of a clear red, without intermixture of yellow, and it should firmly adhere to the bone. To judge of the state of a ham, plunge a knife into it to the bone; on drawing it back, if particles of meat adhere to it, or if the smell is disagreeable, the curing has not been effectual, and the ham is not good; it should, in such a state, be immediately cooked. In buying a ham, a short thick one is to be preferred to one long and thin. Of English hams, Yorkshire, Westmoreland, and Hampshire are most esteemed; of foreign, the Westphalia.

Venison.—When good, the fat is clear, bright, and of considerable thickness. To know when it is necessary to cook it, a knife must be plunged into the haunch; and from the smell the cook must determine on dressing or keeping it.

Poultry.—In choosing poultry, the age of the bird is the chief point to be attended to.

Turkey.—An old turkey has rough and reddish legs; a young one smooth and black. Fresh killed, the eyes are full and clear, and the feet moist. When it has been kept too long, the parts about the vent begin to wear a greenish discoloured appearance.

Fowls.—Domestic fowls, when young, have the legs and combs smooth; when old, they are rough, and on the breast long hairs a[illegible] found instead of feathers. Fowls and chickens should be plump [illegible] at or the neck and white-legged [illegible] bil[illegible]

[illegible]

[illegible] leg[illegible] gree[illegible]

[illegible] he [illegible]

[illegible]

[illegible] yellow [illegible]

[illegible] are very indifferent [illegible] kept. Suppleness of the feet shew them to be young; the state of the flesh [illegible] flaccid when they are getting bad from

keeping. Tame pigeons are larger than th wild.

Hares and *Rabbits*, when old, have th haunches thick, the ears dry and tough, an the claws blunt and rugged. A young har has claws smooth and sharp, ears that easil tear, and a narrow cleft in the lip. A levere is distinguished from a hare by a knob o small bone near the foot.

Partridges, when young, have yellow leg and dark-coloured bills. Old partridges ar very indifferent eating.

Woodcocks and *Snipes*, when old, have th feet thick and hard; when these are soft an tender, they are both young and fresh killed When their bills become moist, and thei throats muddy, they have been too lon killed.

Turbot, and all flat white fish, are rigid an firm when fresh; the under side should be o a rich cream colour. When out of season or too long kept, this becomes a bluish white and the flesh soft and flaccid. A clear brigh eye in fish is also a mark of being fresh an good.

Cod is known to be fresh by the rigidity o the muscles (or flesh), the redness of th gills, and clearness of the eyes. Crimpin much improves this fish.

Salmon.—The flavour and excellence o this fish depends upon its freshness and th shortness of the time since it was caught; fo no method can completely preserve the deli cate flavour it has when just taken out of th water. A great deal of what is brought t London has been packed in ice, and come from the Scotch and Irish rivers.

Mackerel must be perfectly fresh, or it is very indifferent fish; it will neither bear ca r'age, nor being kept many hours out of th water. The firmness of the flesh, and th clearness of the eyes, must be the criterion o fresh mackerel, as they are of all other fish.

Herrings can only be eaten when ver fresh, and, like mackerel, will not remai good many hours after they are caught.

Fresh-water Fish.—The remarks as to firm ss and clear fresh eyes apply to this variet of fish, of which there are carp, tench, pik [illegible] eels, &c.

Lobsters, recently caught, have alway some remains of muscular action in the claw which may be excited by pressing the eye with the finger; when this cannot be pro duced, the lobster must have been too lon kept. When boiled, the tail preserves i elasticity if fresh, but loses it as soon as becomes stale. The heaviest lobsters a st ; when light, they are watery and

b and *Crayfish* must be chosen by
ations similar to those given above in
oice of lobsters. Crabs have an agree-
nell when fresh.

wns and *Shrimps*, when fresh, are fine
isp.

ters.—If fresh, the shell is firmly closed ;
the shells of oysters are opened, they
ead, and unfit for food. The small-
d oysters, the Pyfleet, Colchester, and
d, are the finest in flavour. Larger
called rock oysters, are generally con-
d only fit for stewing and sauces, though
persons prefer them.

PURCHASE OF GROCERY.

the purchase of grocery at a retail
it does not appear that any advantage
e results to the housekeeper from lay-
large stores at once, though the prac-
ay in some situations be convenient.
etail grocer, being compelled to market
goods with ready money, and finding
reat competition in his trade, is induced
at once on his goods the lowest profit
n afford to ready-money customers.
hose requiring yearly or half yearly
, he adds such a per-centage as may
erate him in the end for the slow
of his capital, and for the risk incurred
king bad debts ; this additional charge
y just, and is done in every other retail
ess. Hence the economy in most cases
dy money purchases.

purchasing grocery from the wholesale
r, a family may occasionally gain some
tage in price ; but to do it uniformly
l not be convenient or desirable, either
buyer or the seller. A quick consump-
is desirable of the finer articles of
ry, especially those with aromatic pro-
s, which exposure to the air dissipates.
e family stores, which are slowly con-
d, are daily impairing in quality, ex-
g only some few articles which are sup-
l to improve by that exposure. By
asing from the retail dealer this incon-
nce is avoided. With some other
es of family consumption, besides
ry, the case is different, and of these it
t to keep a quantity in the store-room.

z.—As a security against the adultera-
of tea, many persons have purchased,
gh the means of brokers, whole chests
; but there is a risk of the tea losing its flavour by exposure to the air when so much is purchased, and should the whole chest prove indifferent, there is no power of exchange.

As a rule, it may be here laid down, that whatever articles can be purchased in an unground state, such as coffee, rice, ginger, pepper, and spices, are better than those purchased ground, not entirely from the suspicion of buying adulterated articles, but because all these articles lose their flavour more rapidly when ground than when whole.

Sugar.—Loaf or refined sugar, when good, is of a close texture, of a fine white gloss, and simply sweet to the taste, without other flavour; when inferior, it is coarse and loose in grain, crumbles easily, is a little yellowish in colour, and its sweetness has something of the taste of moist sugar. Moist sugar, when good and unmixed with adulterating articles, is bright, and composed of crystallized grains. A dull-looking moist sugar is always one of an inferior and doubtful quality. Casks of moist sugar are sometimes procured, by families whose consumption of sugar is great, of the wholesale grocer, at a small reduction per pound. The price of sugar, as well as many other articles of grocery, is too fluctuating to be stated usefully.

Rice.—Of rice, there are several kinds in the market. East India rice is generally small in grain, and yellowish in colour; but some of it is excellent. The Carolina is large in grain, and perfectly white in appearance. Of rice it is rarely desirable to purchase large quantities. The larvæ of a fly sometimes infests old rice, and injures it materially. East India rice is generally lower in price than that of West India.

Dried Fruits.—Raisins, Currants, Figs, French plums, ought to be clean and dry, yet fresh in appearance. When adhering together in lumps, they cannot be regarded as good in quality, and in use would prove wasteful.

The Muscadine raisins are dried in large bundles, and have a dry surface with a slight bloom upon them. They are chiefly used for dessert, and are sold at the grocers' under the term "table raisins." The jar or sun raisins are separated from the stalks when dried; and, as well as the Malaga, are chiefly in domestic use for puddings, cakes, &c.

Currants should be new when purchased for stores. They are to be bought new generally in September or October. When currants are offered at a very low price, it may be fairly suspected that they are of the last year's importation, or are of Spanish growth, and not the product of the genuine vines of Zante or Cephalonia.

Arrowroot.—In the purchase of this article it should be observed that, when very smooth and floury, it may be suspected to contain some portion of the starch either of wheat or potatoes; which, although not injurious, does not possess all the valuable qualities ascribed to the genuine arrowroot, in thickening and jellying properly the liquid with which it is prepared for use. A tea-spoonful of real arrowroot will thicken a tea-cupful of hot water or milk, while double the quantity of adulterated arrowroot would be required to jelly the same quantity of liquid.

Spices.—Ginger is of two kinds; the superior is called white ginger, the inferior black. Pepper should not be purchased in large quantities by any one who has not a quick consumption of it, as the strength of it, especially when ground, is constantly lessened by exposure to the air. Cayenne pepper is sometimes adulterated. Of cloves, such should be selected as have a strong fragrant odour, and a hot, aromatic, yet pungent taste. Nutmegs are chosen by weight, the heaviest being the best. Mace, when good, is very unctuous to the touch flexible, and thin; it resembles the nutmeg (of which it is the outer coating) in odour and taste, but it is not equally pungent. In the purchase of cinnamon it is necessary to know that a spurious kind is often sold called cassia. The distinctive marks between cinnamon and cassia are chiefly these: cinnamon is pliable, and breaks in long splinters; cassia is brittle, and when broken, the fracture is not splintered, but closes, and reveals on it distinct coatings, the inner one of which is dark, and possesses a fragrance similar t that of the cinnamon, the outer coating bein paler in colour, and utterly tasteless. Cinnamon is thin as paper, the cassia thick an spongy.

Candles, excluded from the light, an stored in a cool yet dry place, are generall improved by a year's keeping.

Moulds are of various thicknesses; thre to the pound are the largest usually made fo domestic use; short fours are the next size then follow in thickness long fours, shor sizes, middling sizes, long sizes, and eighths These last are chiefly used as bedroom lights or to carry about a house.

The dips are from four to sixteen to th pound. The moderate size of the tens o twelves are such as serve best for kitchen an pantry use, and to carry about a house when oil and lamps are not used.

Wax candles improve by keeping; an exposure to the light, which is injurious t tallow, blanches them. Spermaceti candle are considerably cheaper.

Soap is an article better bought wholesal than retail. It improves in quality by bein kept. It is seldom bought in a dry state The dealer in soap, by storing it in dam places, is aware of the advantage he gains fron the moisture, which adds materially to it weight. Soap, when in a proper state, shoul contain no more than thirty parts in a hundred of water: by nefarious management, a unfair dealer will make it to hold sixty; consequently, when the purchaser has it cut int pieces and laid on open shelves to render i dry and hard, it sustains a considerable los in weight. For the laundry and househol use there are three kinds: the hard yellow the soft, and the hard mottled soap.

THE

COUNTRY GENTLEMAN'S MAGAZINE

OCTOBER 1869

STABLES—THEIR ARRANGEMENT AND CONSTRUCTION.

[Continued from p. 196.]

BEFORE laying the flooring, it is necessary to lay out and place the necessary drains. If the stalls are all at one side of the stable, a drain should be placed at the foot of these, running before them all, and leading directly to the tank or reservoir made for holding the exuviæ. The drain thus placed should have its upper surface at least 1 inch below the level of the foot of stall, so that the liquid may easily drop from the high to the low level. It may be very cheaply formed of the common field drain tile, taking care that the ends are carefully cemented together, to prevent the liquid penetrating hrough the surrounding soil. To prevent he solid excreta from going into this drain, he open top may be covered with perfoated tiles, or flat perforated iron plates. Care should be taken to give the whole length of drain a considerable fall or incline towards he reservoir, not less than 1 inch perpendicular for every 3 feet horizontal. Instead of using the field drain tile, as mentioned bove, a form, as represented in fig. 4 may be sed—*aa* is the body of the drain, *bb* shoulders or projecting snugs, of sufficient size to allow n internal notch, *a a*, to be made. The moveable lid or cover, *c*, is made of cast-ron, with numerous perforations, to allow of he liquid dropping into the drain beneath. f the whole drain and cover are made of on, the size of cover should be made somewhat less than the breadth, to allow of due expansion. The cover being made hollow on its upper surface, the passage of the liquid into the drain will be much facilitated. A drain of the shape of fig. 5 will be better than fig. 4 for withdrawing the products quickly;

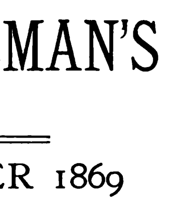


Fig. 4.

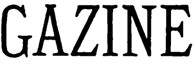


Fig. 5.

it should have a cover similar to *c*, fig 4. This form we are inclined to recommend; it possesses remarkable strength, and offers little resistance to the passing fluid. A trench should be cut, running along the foot of the stalls, to receive the dung, and have the bottom carefully puddled with clay, on which the drain-tiles, or tubes, should rest. If the stalls are placed on each side of the stable, as in fig. 1 (p. 194), a central drain may be situated in the middle of the space between the two rows of stalls, the communication between this and the side drains being kept up by small circular stoneware pipes. Clayton & Co. make a form of "gutter brick." This being laid in the stall, and leading all liquid exuviæ to the gutter, *b b*, which runs in front of the stall. The gutter trench, *a a*, it need scarcely be said, runs at right angles to the gutter, *b b*. A plan of drainage is sometimes adopted, in which the drain tube leading to the outside of the building is intersected at points corresponding to the centre of each stall, with small cesspools, or cesspits, covered with a grating, into which the exuviæ from the stalls passes, and as the cesspools fill up with liquid. This is passed off by the drain tubes connecting the cesspools. This plan is now much objected to, and properly so; for it is obvious that unless very frequently cleaned out, the sedimentary deposits must, of necessity, send up effluvia, which cannot be otherwise than prejudicial to the health of the horses in the stable. In some of the more recently introduced stable drains, the cesspools are trapped, so as to prevent the effluvia from escaping into the interior of the stable; but, notwithstanding this precaution, in practice it is found that the effluvia will arise in amount more or less decided, but still in sufficient quantity to be dangerous. Cesspools should therefore be placed outside, and as far as possible from the stable. It is obvious, however, that drains which are covered, or which are pretty deep, will, in some measure, act as cesspools, elongated cesspools, such as those illustrated in figs. 4 and 5; for these will act more or less decidedly as retaining vessels for deposits, which will, in process of time, send up effluvia. It will therefore be well worth the consideration of those about to erect stables, whether it would not be the best plan to dispense altogether with covered drains, as already illustrated and described, and substitute open or surface drains. These should be shallow, with flat central spaces and rounded corners. The gutter [illegible] be made of hard [illegible] smooth-[illegible] [illegible] [illegible] once whether it is clean [illegible] making the floors of concrete, the gutter may be made at the san time in the concrete. This is much neat than gutters of earthenware, or stone let in, the whole floor is solid throughout.

The reservoirs into which the liquid fro the stalls is to be led, should be so construct that none of the liquid be allowed to escap and permeate through the surrounding so The large central drain should not be tak at once to the tank, but led to a cesspo made at a level some feet below that of t floor of the stable, so that the adit of t drain shall be some 3 or 4 inches above t upper edge. The use of this cesspool is catch and contain the solid matter held solution in the liquid exuviæ, such being fou to be the least valuable portion of the manu moreover, it is found to clog the valves a pipes, which are used to deliver it from t tanks, when required for use. The *cessp* need not be large, and will be best construct of iron, sunk into a hole dug for its receptio A good proportion for its size will be o tenth of the cubical contents of the ta which it is to supply. The pipe leading the tank should be placed within a few inch of the top, so that all overflow and waste m be prevented. The mode of constructing t tank may be gathered from the followi An excavation is first to be made in t ground, of sufficient dimensions. The b form is circular, but of greater diame than depth; if the nature of the soil requi it, the bottom must be carefully puddl The bottom and sides must then be bu over with brick-work—an erect brick set water-tight cement. When a double lini of bricks is used, they should all break join [illegible] the lining consolidating, a layer or ou [illegible] of cement should be applied, so t [illegible] be perfectly water-tight. T [illegible] should be mixed thoroughly wi [illegible] third part of coarse sharp sa [illegible] of the tank should be arch [illegible] of strong timber may be adopt [illegible] should be taken to leave a hole p [illegible] with a cover, to allow of a man descend into the interior when required; a an aperture for the insertion of the pu barrel, or pipe used for withdrawing its c

Tanks may be very cheaply made, by the excavature with tight boarding, and rards covering the interior with sheets of percha—a substance remarkably well ed for this purpose—the joints may be made water-tight, by passing a hot iron them. A tank thus made will last for a long time. As a covering, we would re- iend, for cheapness and neatness, a zinc gated framing. If there is a large :ity of exuviæ produced, a second tank d be provided, into which the overflow the first may be led. The sketch

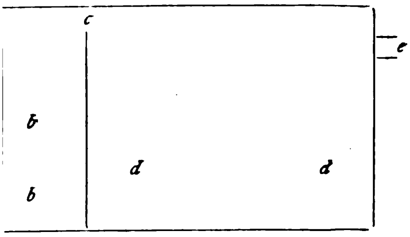


Fig. 6.

6) will shew the relative position e drain, &c.—*a* is the drain leading xuviæ to the cesspool, *b b*, the liquid in siting its sediment flows out by the pipe the covered tank, *d d*. If a second is used a pipe, *e*, leads thereto.

good supply of water to the interior of es is of the utmost importance. Such is sary, as well for effectually cleansing the and flushing the drains, as for the use of nimals. The water should be provided gh pressure. The best mode of obtain- his, is, certainly, by bringing the water a source at a higher level than the build- This, however, cannot always be ob- d. It will, therefore, be best to place a ed tank or cistern at the highest point of building; the pressure thus obtained will fficient to force the water through the with the necessary velocity. A tank on uilding may, however, be objected to. is case, it only remains for an external n to be constructed: this may be placed e back of the building, and raised on s; if elsewhere, it may be made highly nental—the supporting pillars being of Tuscan or Doric order. The pipe for ng the water to the stables may be hid from view, by being led down the centre of one of the hollow supporting pillars. In like manner, the pump-pipe or engine-pipe, by which the supply of water is forced up to the interior of the cistern, may also be there hid. The higher the bottom of the cistern is above the level of floor of stable, the greater will be the pressure in the pipes, and the greater the velocity with which the water is discharged at the nozzles of the pipes in the cistern. The internal arrangements by which advantage is taken of the supply of water obtained from the cistern, may now be explained; and first, as to the cistern for the supply of the animals in the stalls. This will best be made of enamelled earthenware, and sufficient to hold 3 or 4 gallons. This should be fixed at the distance of 2½ or 3 feet from the floor, and be provided with a pipe communicating with the exuviæ drain at the foot of the stall. To regulate the flow of the waste water down this pipe to the drain, we recommend a conical plug to be inserted in an aperture made at the lowest portion of the cistern. The pipe supplying the cistern to be provided with a common stop-crane, which should be placed outside of the partition, at the head of the stalls, if the arrangement explained at fig. 2 is adopted. This will admit of the attendant putting on, or stopping the supply, without disturbing the animals. A door may be made at the back of the cistern in the partition, to have access at all times to the interior of the cistern, to empty it when thought necessary, by taking out the plug. The plug should be chained to the side of the cistern to prevent its being lost. To insure the cistern being emptied at once, it should be made conical in form.

Instead of using the water from the cistern extensively for flushing the drains, the following contrivance may be adopted:—"An iron pipe of the breadth of the stall, and closed at the ends, should be placed at the head of each stall, its underside pierced with small holes, or, what will be better, a slit or aperture stretching across its whole length. This pipe should communicate with a cistern or reservoir. The coarse litter and manure (when the stalls are wished to be thoroughly

ed, and the manure in the pipes to be
d down into the reservoir) being re-
d, the communication between the pipe
e head of the stall and water cistern is
ed (a tank), and a thin but powerful
n of water is projected down
nclined plane of the stalls, carrying
with it all impurities, and the manure
e pipes, to the reservoir. If the stream
ntinued for any length of time, to sweeten
alls, the accession of water to the con-
of the reservoir might deteriorate the
re. To provide a remedy for this, let
e or drain be connected with the drain
ng before the stalls, leading to a cess-
independent of the reservoir. This
should be provided with a stop-crane,
her means for shutting off communica-
The same should be applied to that
ng to the reservoir. By shutting the
crane leading to the reservoir, and open-
hat of the cesspool, the water will run
to, and *vice versa*. Of the plans thus
ed for the flushing of drains, we are dis-
l to recommend the first for its economy,
ugh the latter certainly possesses the ad-
ge of an efficient mode of cleansing the
of the stall. By keeping the plug of
istern, previously described, out of its
and the water continuously running into
e drains will be flushed by the water thus
ied.
great advantage to be derived from hav-
ne water supplied at high pressure to the
ing, is the ease with which fires may be
guished, and the walls, central floor,
ows, cleaned. Thus, in a convenient
of the interior, a brass cock may be in-
l in the flooring, having attached firmly
a gutta percha or vulcanized india rubber
pipe, some inch and half diameter, pro-
, at its further extremity, with a brass
e, half an inch diameter at its aperture.
length of hose should be sufficient to
any desired part of the interior. The
in the floor may be surrounded with a
ircular box, in the inside of which the
may be coiled, so as to be out of the
When required for use, the lid of this
may be opened, the coil taken out, and
the stop-cock opened: the rush of water through the nozzle being directed to any desired place, will effectually remove extraneous dirt, or extinguish flames.

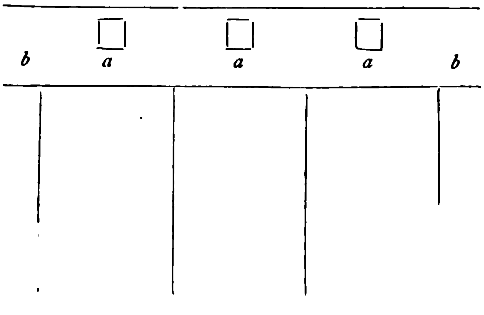
The mode of laying the bed of the stalls has been a matter of dispute amongst practitioners. Some hold, that by making it inclined, the hind legs of the animal are subjected to swellings from constantly slipping down towards the bottom. A horse is certainly shewn to more advantage when lying on a slope than on a level surface. The advantages of having the bed inclined or sloping to a degree sufficient to carry off the exuviæ are very great, and may be obtained efficiently without making the slope so much as to inconvenience the horse. If, however, the bed is required to be perfectly level, it will be essentially requisite to have it provided with perforations communicating with a space beneath, leading to the drain. Some have recommended the bed to be made of oak planks laid transversely to the length, and perforated with holes. A wooden bed is decidedly the most comfortable for the animal; but it may be made cheaply of strong flat perforated tiles, half circular iron pipes or earthenware, with their open sides uppermost, being placed beneath, on which the tiles forming the bed will rest; and the perforations made in such positions that they will communicate at once with the iron or earthenware drains or pipes beneath, care being taken to have the joints elsewhere made good with cement. The exuviæ will permeate through these apertures, and passing into the pipes or drains, will be led to the stall drains, and from thence to the tanks or reservoirs. But whether made of wood, tiles, concrete, or asphalt, we are inclined to recommend the bed to be made sloping; this incline may be very slight and yet efficient; the smoother it is the better, and the more easily will it be cleaned. Concrete or asphalt will make as cheap and comfortable a bed as can be desired. India rubber pavement will also be found good for this purpose. The part near the drain at the foot should be well rounded off, so that the liquid exuviæ may run easily into the drain. Before laying

ed, the drain leading from the cistern to
oot drain should be laid down.
e material of which the floor of the
e should be composed is of some import-
We decidedly object to that form so
met with—namely, round-headed stones
all size. The interstices between these
ly catch dirt, so that the work of keeping
lace clean is very troublesome. Common
ones make a good floor, but tiles laid with
r upon a bed of sand will be efficient and
, forming a hard level floor, easily kept
, and facilitating the working of trucks
nd-barrows for the removal of the offal.
alt, if properly made, will be found
eap and durable form of floor, soft,
and elastic. As the liquid exuviæ
the animals will, in the case of
, be projected over the range of drains
d at the foot of the stalls, the floor at
ides of the stalls should be sloping
ds the drains. The form of central
outside, or between the stalls for a stable
g a double row of stalls, will be one similar
ction to a road high in the centre,
loping down on both sides, the whole
ng a part or portion of a circle of large
ter. At the highest part of the floor,
all railway made of narrow strips of
ron may be placed running the whole
of stalls, and communicating with the
and boiler room. This may be pro-
with little trucks, which would be found
onvenient for taking away the offal, or
nveying various mashes or other food
stalls. Probably the best material of
to form the floor of this stable is the
elled brick. The numerous channels in
rface of the floor formed of these bricks
nly give a firm foot-hold to the horses,
ford a series of small drains, so to say,
hich all liquid is led easily off to the
.

tilation.—Great care should be taken
ve the ventilating arrangements com-
as upon due attention to this
ds, in a great measure, the health
e animals, for it may be taken as
iom, and a point, therefore, which
t be controverted, that the well-being of an animal confined in stables depends upon the amount of fresh air which it is supplied with, other things being equal. Abundance of space in a stable, and which we have already strongly advocated, does, in itself, secure a fair amount of ventilation; but it does not secure all that is necessary; for not only is large cubic space essential to the well-being of our horses, but it is essential that the air be frequently renewed. Now, this cannot be done without special ventilating appliances. And in beginning to arrange these, it is necessary to bear in mind, that two processes must go on, *pari passu*, namely, the supply of fresh air, and the withdrawal of the foul. For it may be taken as axiomatic, that foul air will not be expelled or withdrawn from a building unless fresh air be freely supplied to it. As regards the precise amount of fresh air required by a horse, no experiments or inquiries as yet made, ever resulted in any definite information being enunciated. Roughly stated, it appears, from such experiments as have been made, that on each inspiration, the horse draws into his lungs 100 cubic inches of air, and calculating the number of inspirations which he makes, at eight per minute, the result follows that he will inspire 800 cubic inches of air per minute, or 4800 in the hour. From this amount of air inspired, the deleterious products evolved may be set down at 1 cubic foot of carbonic acid gas per hour, containing, on a rough calculation, half a cubic foot (somewhat less) of solid carbon. But to this a very marked source of deterioration must be added, the *animal* exhalations which proceed from the skin of the animal, as well as from the breath which is passed from the lungs, which, being in a moist condition, very rapidly deteriorates the air. The amount of these exhalations in solid matter may be set down at over the half pound per hour. To dilute, or rather to get rid of the carbonic acid gas evolved per hour by each horse, at least 1000 cubic feet of fresh air will be required, and if we add the other sources of deterioration named above, then an extra quantity will be required, say three times more, 3000 cubic feet, per hour; if, indeed, we take into account

the deteriorating sources arising from the presence of the exuviæ, liquid and solid, let into the stable, or too often left in it, it will be obvious that a very much larger amount of fresh air per hour is required. Some authorities place this at an amount varying from 4000 to 6000 cubic feet, and as it is indubitably safer to err in excess rather than deficiency, we may set down the latter amount as that to be given to each horse. A stall 6 feet wide, in a stable 18 feet wide from wall to wall, and 12 feet from floor to ceiling, will give a cubical space of 1296 feet, with a superficial one of 108 feet. To give the amount of 6000 cubic feet of air per hour to the horse occupying this stall, the air will be required to be changed five times every hour. This will be 480 cubic feet in excess of the estimated quantity; which, however, need not be considered as too great; our object being to place the animal in a condition as nearly approaching to his natural one as possible, in which he has always the maximum of fresh air supplied. We now proceed to point out some of the methods by which the necessary change of air required is effected.

In the case of a stable with a row of stalls on each side of a central walk, the air may



[illegible] central walk [illegible] the small venti[illegible]

lating gratings in the outside passages *b b* *c* the large one in the central walk *d d.* I the apertures *c c* (which may be supplied wit air by ventiducts leading from the outside heating boxes or pipes may be placed, th temperature being kept up either by steam o hot-water. In winter time, the apertures *a* may be closed up, and the air, being the only admitted by *c c*, will be heated on it entrance to the interior, passing over th heated surfaces of the pipes or boxes Heating boxes may also be placed in eac alternate aperture in the outside passages *b b* If one row of stalls is only made, an ai tunnel or ventilator should be made runnin along within a few feet of the front of th stalls, having, at regular distances, aperture made to admit the air, the fresh air bein supplied directly from the external atmosphere.

In the majority of cases, however, it will no be necessary to have special arrangements fo warming the interior of stables, the horse no being an animal which requires artificial warmth on the contrary, in his natural condition, h is subjected to the extremes of temperature At the same time, it is to be observed, tha there are those who deem warmth essential, so essential that they will do away with all ventilating arrangements, rather than with the raising of the temperature of the stable. In such cases, it will be necessary to have special arrangements for warming the air of the stable so that while the warmth is secured, the ventilation will not be neglected. Another mode or admitting fresh air is recommended by an authority, merely having in the wall opposite each horse, an opening made, covered by a [illegible] of perforated zinc. If openings in the [illegible] preferred, means should be taken to [illegible] the supply of air through them, as, [illegible] should also be attended to in cases [illegible] ventiducts are adopted. The [illegible] for admitting and regulating [illegible] of fresh air are very numerous; [illegible] ted to openings either near the [illegible] some distance from it.

[illegible] one form the opening in the wall is covered by a plate valve, moving on a hinge joint this being tightened by nuts, so that it will remain fixed at any angle of opening desired. In another form, the valve slides in front of the opening in the wall within a frame secured to the same; and is suspended by a chain or cord passing over pulleys, and counterbalanced by a weight, so that the valve will remain suspended at any desired height of opening. Some authorities mention that the fresh air should be supplied to the interior of buildings from a high level, so as to be free from the sources of air-contamination met with at the lower level near the ground. The air in this case is led by channels or ventiducts made in the interior of the wall, leading to the points in the building where the air is to be delivered, the air being admitted to the channels by openings made near the upper part of the walls in the exterior.

So much for the appliances to supply and regulate the amount of fresh air supplied to the interior of the stable; we now draw attention to those necessary to secure the withdrawal of the foul air. And first, as to the form of roof adopted. The best form is what is called the open roof, in which the foul air can be withdrawn at once, from ventilators placed in the ridge; the worst is that in which there is a ceiling, a long loft or other apartment being placed above it. Where a ceiling is adopted with apartments above, it will be essential to have ventilators passing through the apartment, as in fig. 8, as *a a'*, these ventiducts being furnished at top *a'*, with a ventilating cowl or "top," and provided with a regulating valve at the lower part *a*.

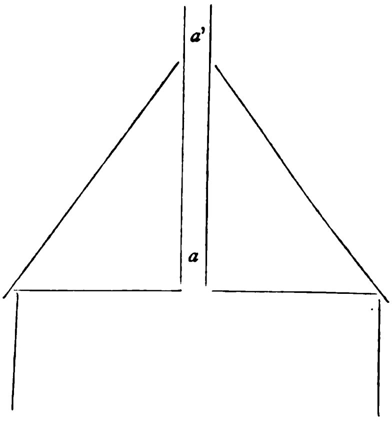


Fig. 8.

WIRE FENCING.

BY MR JOHN KAY, ROTHESAY.

IT is now so common—almost necessary—to have information on every subject, let it be what it may, that a few observations in connexion with the present subject may not be out of place; and though we do not expect to be giving anything new or wonderful, still, a few observations may be worthy of notice.

Wire fencing is, without doubt, one of the most common and useful of fences, and when erected with iron standards and straining posts is a very neat and efficient fence. When erected with wood posts it also possesses an advantage over common wood palings, as the wires can be erected after the posts are decayed.

The wire in general use is either "bright" —that is, hard tempered, or "annealed." Bright wire possesses the greatest strength and elasticity, which is the great principle of wire fences. Annealed does not possess these advantages in the same degree, and is more liable to yield to the strain through length of time, but being cheaper is nevertheless much used. It is also of primary importance that the wire, whether "bright" or "annealed," be of the best quality. Bad or brittle wire causes a great loss of time in its erection, and is easily broken after it is erected, which entirely frustrates the principle of a wire fence. Solid wire is sometimes galvanized, but it deteriorates the quality of the wire. "Wire strand" or "cable" is now extensively adopted, and is remarkable for its flexibility, being almost as pliant as a common rope, and being generally galvanized is not liable to rust. When erected with iron standards and straining pillars, it forms an efficient and ornamental fence.

The staples for attaching the wires to wood posts are either "cut" or "hammered." For ordinary purposes "cut" ones do perfectly well, and are not half the price of "hammered" ones.

The tools required in erecting wire fencing are,—one straining machine, a straightening machine for taking the bends out of the wire, pair clamps, pair round-mouthed plyers, key for twisting wires, file, cold chisel, small clench hammer, common nail hammer, and plugs for holding the wires while being fastened. The plugs may be either iron or wood, but when made of well seasoned oak or ash do most admirably for wood posts. Improved straining machines are now constructed so as to dispense with plugging or wedging, and leave the wires free at the end when being fastened round the post. Along with the usual indispensables—pick, spade, and mallet—a sharp pointed "poker," formed of 1¼ in. round iron, 5 ft. long, is a most useful tool, and should always be at hand for piercing the ground for stobs, or in the digging of post holes that are hard or stoney. There are various other tools and appliances more or less useful, but such will naturally suggest themselves when required.

As wire fences are erected with wood and iron posts, we shall take up each method separately, First—

WIRE FENCING WITH WOOD POSTS.

In regard to what length of wire should be strained at once, it depends very much on the line of fe[illegible] the line is straigh[illegible] and [illegible] gateways [illegible] may be str[illegible] [illegible] posts [illegible] Whe[illegible] stand[illegible] afte[illegible] being strained

When the line of fence is more or l curved, strong posts should be put up ev 10 or 20 yards, according to the nature the curve, and the fence run straight betwe these posts, which is the most effective w of keeping a fence secure in such parts, the common intermediates are liable to yie to the strain when run in curved lines. (course they can be stayed, but the few props the better, both for appearance a durability. Posts should also be put up all abrupt hollows.

A wire fence should not be less than 3 f 6 in., and for a still more effective fence 3 f 9 in., with six lines of wires, and if for shee and lambs seven wires; top wire No. 3, tw next No. 4, next wire No. 6. (For ligh stock No. 4 may be substituted for No. 3) For ordinary purposes the above height i sufficient, but where it is necessary to have a fence of a greater height, the number of wire should increase accordingly. Wire fence should always be of a height, and the wire sufficiently close, to prevent the stock the may enclose from overreaching or gettin betwixt the wires.

In erecting wire fences with wood posts well-seasoned larch should always be used The bottom ends of posts are sometime charred in order to preserve them from decay but, however beneficial it may be to well seasoned wood, wood should be neithe charred, tarred, nor painted, if it is in a gree state, for it will only hasten its decay.

For a fence to stand from 3 ft. 6 in. to 3 ft 9 in. high, the straining-posts should be 7½ ft. long, and 8 in. through at the small end. The intermediates should be 5½ ft. long, i driven into the ground, and if pitted, 6 ft. The[illegible] may be either round or sawn, if sawn [illegible] be at least 2½ by 3½ in., or [illegible] through quartered, which makes [illegible] with the least possible sawing; or [illegible] wood, 4 to 5 in. through at the small [illegible] if the ground is not too hard, it will [illegible] facilitate the work, by piercing it with the iron "poker" previous to driving in the stobs; but if it is a tilly hard bottom, the better plan is to pit them, as the driving is

: to bruise and split them. The stays ld be 9 ft. long, 5 by 2½, or round wood 4 in. at the small end.

ode of Erecting.—First, stake off the line ace, then have the pits dug for the strain- osts. The pits should be dug length- across the line of fence, say 2 by 3 ft. to have the least quantity of soil dug site the pressure of the straining-post, at the same time to be sufficiently wide low the soil to be firmly beat round the a point of particular importance. The should be put at least 3 ft. in the nd, and braced with two pieces of wood long, nailed on each side of the bottom e post, so as to prevent the post from out of the ground; next, the stay is put up ep the post from being drawn over. It ld be kept to the opposite side of the of wires from which the stobs are driven, to allow the wires to pass freely. It is ked into the post about 3 in. below the vire; the bottom end should be sunk at 18 in. in the ground, in order to have od hold of the solid, a flat stone being put re against it and rammed firm with 1, and two pegs driven down behind the :.* (Now, before proceeding one step er, let it be understood, that if the strain- osts are not well secured, all the rest of vork is useless). The next process is to the holes bored for the wires to pass igh, a ¾ in. auger will do. In pro- ing to this, a straightedge—a piece of ence will do—is laid across the centre of op of the post, in the direction of the :, and a line drawn. The straightedge xt put up and down the side of the post, a line drawn from top to bottom. The nce between the wires are marked on ine, the top of the post being kept 9 in. e the top wire. In boring, the auger is in line with the line drawn across the top. straightedge may be fastened on the top : the post is being bored. The wires laid out alongside the line of fence, and spliced, which may be done in various ways, see figs. 1, 2, 3, the bottom wire is strained. Then, if the line of fence is nearly straight and level, drive a stob in at every 24 to 30 ft. apart, to these the top and bottom wire is stapled, which will give the direct line and height of the fence. After having the top wire partially strained and stapled, one man goes along with the mallet and drives down the stobs that are high, according to the direction of one who looks along the line of stobs. The standards being brought to a level, the spaces are filled up with stobs to 6 ft. apart. In driving them, they should slip freely against the wires, but not to take the wire out of line. The top of the stobs should be 2½ in. above the top wire. The stobs being all driven in, the wires are strained, beginning at the bottom wire and working upwards, which renders the wire less liable to be affected if the straining-posts should *give* in the least. The wires being all strained and secured round the posts, the wires are then stapled to the stobs, or intermediates, as they are sometimes termed. In stapling the wires, take a piece of wire about the height of the fence, and turn a hook on the end of it, then mark off the distance between the wires with a file. This is hung on the top wire, and forms a handy and expeditious guide in putting the wires at the required distance apart. For six-wire fence, the distance betwixt the wires should be, beginning at the top, 9, 8, 8, 6, 6, and 5 in. to ground. In driving the staples, they should not be driven completely "home,"—they knee the wire, and are a great hindrance when a wire is to be repaired, as the operation cannot be performed till the staples are drawn.

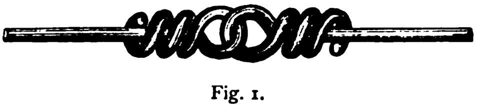


Fig. 1.

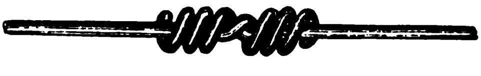


Fig. 2.

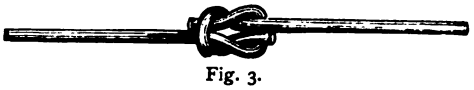


Fig. 3.

:he stays are sometimes put underground so as interfere with the appearance of the fence, but effective support the more direct they are oppo- ie strain the better.

When the intermediates are pitted, temporary standards should be put up, from 10 to 20 yds. apart, according to the nature of the line of fence, to which the top and bottom wire should be tackled to, and brought to a level, by driving down the higher, and raising the staples of the lower parts. When brought to a level it forms a definite guide for putting up the intermediates, all that is required being to plumb, and bring them in contact with the wires, allowing the required distance above the top wire. If the intermediates are round, the tops should be rounded off with the chisel and spokeshave, after the fence is erected.

If the line of fence be of an undulating nature, the fence should be levelled according to the general surface of the ground, avoiding all abrupt hollows.

WIRE FENCING, WITH WROUGHT IRON STANDARDS AND STRAINING-POSTS BATTED INTO STONE BLOCKS.

A wire fence to stand 3 ft. 6 in. to 3 ft. 9 in. high, the straining-posts should be formed of 1½ in. square bar iron, about 6 in. longer than the height of the fence, so as to allow 1 in. above the top wire, and about 5 in. to be rounded and barbed, to be fastened into the stone block. They should also be pierced with oblong holes at the proper distance apart, so as to admit two lines of wires. The intermediates should be formed of 1¼ in. by ⅜ in. iron, and may be 1 in. shorter than the straining-posts. They are pierced with round holes to suit the No. of wire used, and also [illegible] admit a key—a small half round piece [illegible] three top holes, so [illegible] they [illegible] catt [illegible] pieces [illegible] thick; the [illegible] and stays 18 in. square [illegible] can be got, whether whin or freestone, they may b used; they should have at least one fl bedding side, so as to lie solid. If they a of a soft nature, the holes for batting th standards into may be cut with commo batting irons; but if they are of a har nature, they should be bored with a dri about ¼ in. larger than the size of the iro observing to keep the holes rather wider a the bottom than at the top—what is terme "dove-tailed"—so that the standards may no pull out. The standards may be made fa with either lead or brimstone. Brimstone i melted over a slow fire, and mixed wit *sharp, dried* sand, and when it is at th proper consistency (which may be ascertaine by cooling a drop or two), run in round th standards, observing to keep them in a ve tical position. In using brimstone the hole should be carefully cleaned out, as the lea damp or dust is liable to leave the standar slack, and not being like lead, it can't b fastened afterwards.*

Mode of Erecting.—Stake off the lin of fence, and lay down the ***line*** in th direction. Then begin at the end of th fence and mark off the pits for the stan ards. They should be dug 9 in. wider an 3 in. deeper than the stones, so as to b got turfed over without being raised abo the natural level of the ground. The pi being all dug, the straining-posts are put position and stayed (stays will only required at the end of the fence, as the int mediate stretches of wire will support ea other, a temporary stay being only used whi he work is in progress). The stays may formed of a piece of 1 in. square iron 5 long, or two pieces of flat iron 1½ by ⅜ i nick formed with a slight ogee curve, a [illegible] together at about one-third of th [illegible] each end, being kept as far ap [illegible] the wires to pass through free [illegible] are welded together, the botto [illegible] rounded and barbed, so as to ho [illegible] perly. The upper end is bevelled, so o lie flat against a small projection ab below the top wire hole, and either ed or made fast with a bolt and nut.

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* A compound of brimstone, &c., termed "lav is sold at 14s. per cwt. It is considered as good not better, than lead, and will go six times as far.

being ready, the standards are set into ts, and put in their proper position, by ing a line in the top wire hole in the ing-post at the end of the fence, and run- through all the intermediates to the next ing-post, the line is then pulled tight, eeps tense by a weight. This gives a uide for levelling the standards, for what n can be lowered, and what is low can ised, by putting in a little earth, and g it firm, so that it may not subside ards, a point of particular importance. nging them to a line, this is easily done fting them either a little to one side or her.

standards being all plumbed, and made by filling in the soil gradually, and g it firmly with a rammer, the wires are ed to the straining-post at the end of nce, and run through all the standards next straining-post, observing that none knots or splices come in contact with ndards. If this is likely to take place, ire must be shortened at that part. ires are next strained in the usual way, cured with an iron plug till once they stened round the post. Lastly, the rds are secured with half-round iron s, driven in the two top wire holes; eparate wedge should be driven from ite sides of the standard, so that they ot be driven aside.

going round curves, stays will be re- to support the standards. They may med of either round or square ⅝ in. nd are fastened into stone blocks, and d to the standards. But stays should d as little as possible, as they disfigure pearance of the fence, and, likewise, to be bent with cattle.

e fence standards are now constructed eat variety of forms, so as to dispense one blocks, and are generally named ing to their peculiar form, such as gular foot," "flanged foot," "tripod &c., &c.

w eye bolts for tightening the wires are sometimes used, but are only suitable for the ends of a fence, and are not of much advantage; for after the wires are taken up two or three times, the points project past the post, and are dangerous for cattle. Improved self-winding straining pillars are now extensively adopted, and though expensive at first, must ultimately be the cheapest and most effective way of keeping a wire fence in order, as the wires can be kept strained to a nicety, and, therefore, should always be used as far as practicable.

WOOD, WIRE, AND IRON FENCES CONTRASTED.

Wooden fences are, in most cases, but temporary fences. It is well known that it is a difficult matter to keep up palings in exposed situations, being liable to be blown down, and in the most favourable situation not standing more than ten years; by that time there will have been as many stobs used in keeping them up, as in erecting them at first. Now, this is a matter for serious consideration. A fence rendered useless in ten years, though erected of the best larch, and at considerable expense. Yet such is too often the state of matters, and is looked upon as mere matter of course, and, in many cases, is repeated from day to day, and year to year, with little or no attempt at any reformation. It may be said, though wood palings don't last long they can be renewed, and are not so expensive as more permanent fencing. Of course, renewed they must, but if there is an opportunity of avoiding the difficulty, either in whole or in part, why not do it? Iron fencing, though costing double and triple the cost of a common paling at the first, will pay itself in a few years. Instead of erecting wooden palings, sell the wood and purchase iron fencing, which will be both ornamental and satisfactory, whether as an enclosure or plantation fence.

How many cumbersome old earth banks and ricketty palings should be made to disappear before the spade and mattock of the workman, which are nothing but a continual annoyance, and an eyesore in every direction, and if levelled and good substantial iron fencing erected, it would be both a present and lasting improvement.

TABULAR VIEW OF THE PROBABLE COST OF THE FOLLOWING KINDS OF FENCES FOR TWENTY YEARS.

KIND OF FENCE.	First cost of Fence per Yard.	Repairs first Ten Years.	Re-erecting at Ten Years.	Repairs second Ten Years.	Re-erecting at Twenty Years.	Total cost in Twenty Years, per Yard.
4 Barred Paling	1/	/3	1/	/3	/1	3/6
7 Wire Fence with wood posts	1/2	/3	/9	/3	/9	3/2
7 Wire Cable Fence with self-fixing iron standards and self-winding straining pillars.	2/6	/3	..	/3	..	3/
Hurdle Fence	3/6	/3	..	/3	..	4/
Continuous Bar Fence	3/6	/3	..	/3	..	4/

In quoting the above prices, we have given those of the best fences, and are from 6d. to 9d. above the average; and though there is no interest taken into account for the extra cost of the iron fences, compared with wooden palings, it is far more than compensated by the superior value of the iron fences at the end of twenty years. For, supposing the iron fences to be worth two-thirds of their first cost of material, the cost of the respective fences would appear thus:—Four-barred paling, 2s. 6d.; 7 wire fence, with wood posts, 2s. 2d.; 7 wire cable fence, with self-fixing standards, &c., 1s. 8d.; hurdle fence, 1s. 10d.; continuous bar fence, 1s. 10d.; which shews the most expensive fence to be the cheapest in the long run.

In regard to what kind of fencing should be used or have the preference, much depends on situation, outline, and the surface of the ground, which should always be considered before erecting a fence. If the line of fence consists of curves, either hurdles or continuous bar-fencing should be used. Wire fencing, no doubt, from its light appearance, gives a good effect in certain situations, such as lawns and shrubberies, which is, perhaps its best situation, as it does not obscure the foliage or interfere with the general appearance of the landscape, being almost invisible at a short distance. But if t ground be undulating, and the line compos of quick curves, wire fencing should not used, being difficult to erect and maintain curved lines, requiring a great number stays, both expensive and unseemly whe bent, which is very liable to be done b cattle coming in contact with them, an at least, the stays give the fence propped appearance. Wire fencing, from its very nature, is only adapted for straight lines, where the very tension of the wires constitutes to the stability of the fence. On the contrary, when erected in curved lines, there must be a counteracting force, or, in other words, the intermediates must be made to sustain the pressure or strain of the wire.

Iron hurdles, though superseded to a certain extent by continuous bar-fencing, are, when well constructed, still possessed of sufficient merit to be worthy of a place. No doubt they are sometimes defective, but such is more owing to the manner in which they have been constructed than anything else. The defect will be often found in the hurdles having been constructed of iron of too small dimensions, and the rods too wide apart for the kind of fence required; or easily upset, which will be found to be principally owing to the prongs being too short, and not sufficiently wide apart to afford firm foot-hold defects which will render any fence unworthy.

As to the comparative advantages o hurdles and continuous bar-fencing, it is to certain extent a matter of taste which shoul have the preference, more especially if th standards are simply driven into the ground and the line of fence is straight; but if th line of fence is curved and undulating, continuous bar-fencing is more easily erecte and better adapted. And if the standard are fastened into stone blocks, it gives stability to the fence that neither fence ha otherwise. Whatever kind of iron fencin be adopted, it should always be of a sufficient height and strength for the purpos intended; for it is only a temporary del sion to erect an inferior fence, and expe satisfaction.

Farm Architecture.

ROOFS.

[Continued from page 490.]

IN fig 1 we illustrate a truss for a roof over a yard, or for that of a very wide building, and is adapted for a roof of from 76 to 80 feet span. The pitch should be one-fourth the breadth of the span. The size of the rafters, tie-beams, and diameters of king-rods, suitable for different spans, are tabulated below. The number of struts to each rafter should be one less than the number of times the span is a multiple of the pitch, which in this case will be three. The longest strut should be the same breadth as the depth of the rafters, but the shorter struts need not be so wide.

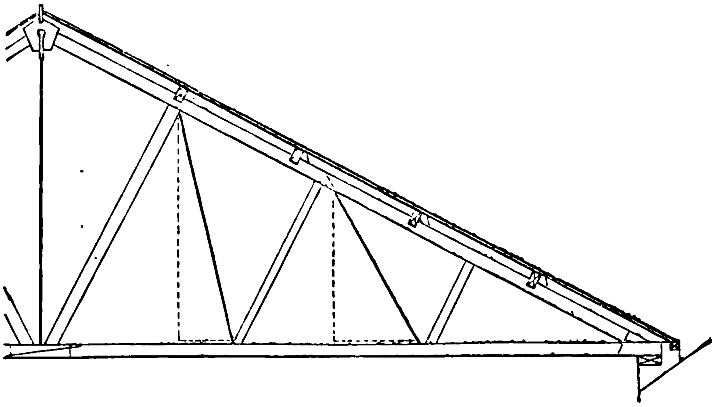


Fig. 1.

Span in Feet.	Rafters, width in Inches.	Tie-Beams, width in Inches.	Diameter of King-Rod in Inches.
36 to 40	6	6	¾
41 to 50	6	9	⅞
Above 50	9	9	1

In fig. 2 we illustrate a form of roof adapted for a double range of cattle-feeding boxes, with feeding passage between.

In all the roofs, which we have illustrated in these papers, there should be purlins right angles to the plane of the trusses. T purlins, for any distance apart of the truss not exceeding 9 feet, need not exceed 4 inches by 3 inches; but for every foot i crease in the distance apart of the truss half-an-inch should be added to the depth the purlins. Instead of spars for supporti the covering of the roof, there should be clo boarding 1 inch in thickness where the d tance apart of the purlins does not exceed feet. When the distance apart is at or bel 4½ feet, the boards need not be more th ¾-inch thick, and the thickness of the boar should be increased one-sixth of an inch f every foot the distance that the purlins a apart beyond 6 feet.

The above-described trusses are all of the of very great strength, and most economi as to their cost. In none of the roofs rep sented by the diagrams given does t strength depend upon the scantling of t timber used. The strength of the roof pends almost entirely upon the king rod and braces.

By slating the roof on close boarding, the great power of slates in conducting heat—the only objection to the use of the most durable of all materials for the covering of roofs—is counteracted.

In a previous paper (page 197), we directed attention to a new material for roofing—the asphalted pasteboard of Messrs Erichsen & Co.—and we are justified in saying, that for all ordinary purposes, and economy of cost, no material has yet been introduced which can surpass it.

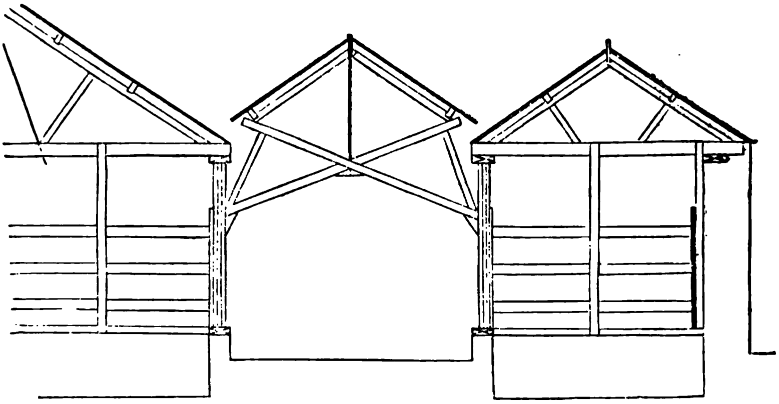


Fig. 2.

A writer on the subject of roofs for agricultural buildings, Mr Bailey Denton, raises an objection to the use of iron, as herein recommended, in buildings in which live stock are lodged, from the exhalations from the animals, and from the excrements rapidl corroding it; but iron may be rendered proo against corrosion from this or almost an other cause by its being smeared over wit any kind of animal or vegetable oil, whils heated short of redness in day light, so tha Mr Denton's objection to the cheapest an best construction of roofs of buildings fo agricultural purposes is without any reason whatever.

The previously described trusses may al of them be constructed from Baltic deals, inches by 3 inches, either in the whol breadths, or ripped into breadths of 4½ inches or 6 inches. By the use of ready saw timber a very great saving of labour is effecte in the construction of framing for roofs which is an important item in agricultura buildings.

The Farm.

EXPERIMENTS ON THE CULTIVATION OF TURNIPS.

ARTIFICIAL manures offer many advantages to the farmer of the present day, that were not enjoyed by the cultivators of the land forty or fifty years ago. The farmer, in those days, could only manure a limited extent of his land for green crops, the extent depending upon the quantity of his farm-yard manure, and, unless his farm was situated within a moderate distance of a large town, he could only manure his fields in rotation once every five or six or even more years, besides being obliged to keep a large portion of his land in summer fallow, or in continued pasture. Now-a-days, a farmer has it in his power to raise any amount of turnip or other root crops, by means of the various artificial manures offered for sale, at prices sufficiently moderate to afford good profit, if judiciously applied to the land.

The average agricultural produce throughout the country, taking one year with another, appears low, notwithstanding the having at command the many new fertilizers of the soil, as artificial manures, and it may be doubted whether such advantages have been made available to the extent they ought. The average produce, per statute acre, in the United Kingdom, has been estimated as low as 16 to 24 bushels of wheat, 32 of oats, 34 of barley, 6 tons of potatoes, and 10 tons of turnips. At the same time, some fields have been found to yield 80 bushels of wheat, 100 of oats, 80 of barley, 30 tons of potatoes, and 60 tons of turnips.. The great difference between such returns as these and the above-noted averages, can hardly be considered as altogether owing to difference in quality of soil. A farmer can enrich and fertilize his land by manuring, and cause a poor soil to give double its ordinary crop; but prejudice seems in the minds of some farmers to operate against the use of artificial manures. No doubt losses through failures in their effects, may have deepened such prejudices. But if patient attention be given to the consideration, that grain of all kinds contains, as found by chemical analysis a notable portion of its weight of mineral matters derived from the soil, and which are not, as those of the straw is, returned in the dung, the important part that artificial manures can perform in restoring what was abstracted by the grain in phosphates, potash, soda, and other minerals, will be perceived, and the theory of their action as fertilizers be better understood.

All farmers know that plants in their natural growth obtain from the decayed and decaying roots and leaves of plants that grew and flourished during previous years on the same ground, an important part of the food they require to sustain and enlarge their growth. The trees of the forest are nourished by the leaves they shed. In spreading the dung accumulated in the farm over his fields, the farmer returns to his land as manure, what he gathered from it as crop, but not all. The grain he sold away, the milk, the butter, the cheese, the flesh-meat and bone, that grew at the expense of the growth of the land, is not returned to it in the dung. Thus year after year some of the ingredients derived from the soil, and of which the produce that was sold was made up, will require to be compensated for, otherwise the land will become less fertile This is especially the case with the minera substances found by chemical analysis in al plants, and in animals as well. Now, as such mineral substances cannot be derived from either the air or water, as some others o the vegetable nourishments are obtained, the plant must find them in the earth. As each and every ingredient found in the composi tion of a plant, however small in quality, must be essentially necessary to its complete growth and formation, the want of any one of such matters in the soil accounts for sterility and low productiveness. But it is a question if any soil is entirely destitute of any of the mineral ingredients that plants require. White crops in succession deprive the soil of its mineral virtues. In soils so impoverished, the young plant finds it difficult to obtain its necessary requirements. It grows slowly, and reaches a stunted maturity—short straw and little grain. A soil may be rich enough in some, but deficient in other important materials of vegetable nourishment. Soils suffer most from the obstruction of the mineral ingredients contained in the produce of the land that is sold away, whether in the form of beef, milk, or grain. The restoring to it of such or similar mineral matters is indicated as advisable practice. This leads to the consideration of what these mineral substances have been found to consist of. As these remarks are meant more particularly to draw the attention of farmers to the advantage of extending the cultivation of the turnip by means of artificial and other light portable manures, the mineral matters found in the ashes of the turnip bulb are here set down by their chemical names:—

Analysis of the ash of turnip bulb.

Silica	2.75
Phosphoric acid	8.77
Sulphuric acid	11.71
Carbonic acid	12.66
Lime	6.46
Magnesia	[illegible].51
Per oxide of iron	[illegible]
Potash	[illegible]
Soda	[illegible]
[illegible]	[illegible]

[illegible] that [illegible] dry stuff out of every [illegible] lb. of [illegible] this dry stuff, on being burned, and its ashes analysed, the abov named mineral substances are found to hav formed part of the constitution of the plan The ash of the tops or leaves is muc greater per cent. than that of the bulk. Lim predominates in the ash of the top, bein about 35 per cent. of the whole ash; whil the bulb ashes are, of lime, about 6 per cen There is also a difference found in the pro portions of the mineral ingredients in differen species of turnip, but the difference is not s great as to be of importance to consider her The following, however, is the mean of th analyses of six different species of turnip, i cluding the white globe, hybrid, and swedes.

Silica	1.81
Phosphoric acid	9.85
Sulphuric acid	13.12
Carbonic acid	11.96
Lime	9.93
Magnesia	2.61
Per oxide of iron	0.46
Potash	34.10
Soda	7.96
Chloride of sodium	8.13
	99.93

Of the mineral substances above note there will be in an acre of 20 tons of turn bulbs and tops as much as 600 lb. weight such mineral matter, and if the whole cro be abstracted from the land, it would nat rally be supposed to be minus to the exte of the 600 lb. But it is to be consider that soils of ordinary quality contain in the earthy or inorganic part, much of the coars mineral matters, such as the lime, the silic and the sulphur, that the turnip may be supposed to have made use of or assimilated [illegible] its growth, and that the plant found the oth needful ingredients in the manure applied [illegible] cultivation; at all events, land, after a cr [illegible] which had only bones or guano [illegible] in a condition to give a tolerab [illegible] without manure. The droppin [illegible] the stirring and opening up the ground to the action of the air, enabl the soil to attract nitrogen from the air d during the growth of a turnip crop, and su nitrogen in the soil becomes available for t crop following, as found by experience.

e analyses of turnip ashes shew that h and soda form a large portion of the als found in them. This indicates that ed manure containing these ingredients l be good for turnips. They favour the h of the leaf, which, spreading largely e air and sun, extract therefrom nitrogen mmonia, which corn plants, from scanti- of foliage, require to find in the earth, take up by their roots. It may be ted that these considerations are theo- l or speculative; let us see how far they with experimental practice.

ield of about 10 acres was laid off in e lots to be experimented upon. The f this field was of a light, blowy, sandy e, with some rubbly surface stones; il, sandstone rock, almost as poor as and in the county. It was ploughed a crop of oats, and sown with red round at the end of July.

1 was manured with 8 bushels crushed bones bushels turf ashes, costing £1, 6s. 8d. Pro- 9 tons 1 cwt. 3 qrs. 20 lb. of bulbs; 3 tons 2 5 lb. tops.

e cost for manure in this experi- is about 2s. 8d. per ton of bulb, sive of about 3 tons tops and tails. return in this experiment was small, is to be considered that the land was and the manure not liberal. The next e lot of the same field, had more liberal ring of a nitrogenous sort, and at a much er expense.

2 was manured with 8 loads dung, 3 cwts. , 20 bushels turf ashes, ½ cwt. nitrate of soda, ½ cwt. nitrate of potash. Cost, £4, 13s. 10d. ce, 13 tons 1 cwt. 2 qrs. 24 lb. bulbs; 5 tons

comparison of the return in this experi- with that of the one preceding it, is y of attention. The cost for manure in nstance per ton of bulb is about 6s. 8d., e other only 2s. 8d. Neither the dung he guano appears to have acted to expec- . It shews that dung might be dis- d with, being applied along with arti- manures, and might be used with more tage to the grain crops. The experiment in the next 1 acre lot will shew this more pointedly.

Lot 3 was manured with 8 loads of dung, 4 bushels of bones dissolved in 84 lb. sulphuric acid, and 16 bushels of turf ashes. Cost, £2, 6s. Produce, 7 tons 1 cwt. 2 qrs. 26 lb. bulbs; 3 tons 0 cwt. 1 qr. 20 lb. tops.

The return in this instance is 2 tons less than that of lot 1, which has no dung with the bones. The growth ceased sooner in this than in any of the other acre lots. It might have been expected that 8 tons of dung and 4 bushels bones would have acted as well as 8 bushels bones alone. The result in this experiment does not speak in favour of dung being superior to artificial manures. The next experiment will shew that 1 cwt. guano can act much better as a manure than 8 loads dung.

Lot 4 was manured with 4 bushels bones, 84 lb. sulphuric acid, 16 bushels turf ashes, and 1 cwt. of guano. Produce, 12 tons 0 cwt. 2 qrs. 24 lb. bulbs; 3 tons 1 cwt. 3 qrs. 24 lb. tops.

The manure given to this acre was the same as that put on the one preceding it, with the exception of 1 cwt. guano being applied instead of 8 tons of dung. Yet the produce was 5 tons of turnip bulb greater, and cost for manure per ton of turnip 3s. 4d. less. The experiment on the next acre will indicate the action of potash and soda on the growth of the turnip plant, one of these is a high-priced article, but as it is a large ingredient in the mineral constitution of the turnip it may be well to observe the action of potash and soda when added in aid of other manures of the artificial sorts.

Lot 5 was manured with the same stuffs, quantity, as lot 4 above noted, with the addition thereto of 56 lb. of nitrate of soda, and 56 lb. of nitrate of potash; which addition raised the cost for manure, from £1, 12s. 2d. to £3, 0s. 2d. Produce, 14 tons 1 cwt. 1 qr. 4 lb. bulbs; 5 tons 1 qr. 4 lb. tops.

We see in this experiment the alkalies raised the amount of produce more than 2 tons of bulbs above that of lot 4, besides greatly increasing the amount of the leaves or tops.

Lot 6 was manured with 8 loads of dung, 3 cwt. of guano, 20 baskets of turf ashes, 56 lb. of nitrate of soda, and 66 lb. of nitrate of potash. Produce, 13 tons 1 cwt. 10 lb. bulbs; 4 tons 16 lb. tops.

The dung does not seem to have done much good in this, more than in the experiment in lot 3.

Lot 7 was manured with 8 bushels bones, 16 bushels ashes, 56 lb. each of nitrates of potash and soda. Produce, 10 tons 1 cwt. 1 qr. 2 lb. bulbs; 3 tons 1 qr. 4 lb. tops.

Cost per acre for manure, £2, 14s. 8d., or per ton of bulb, 5s. 6d.

The other lots in the 10-acre field shewed results so nearly similar to the foregoing, as regards dung combined with artificial manures, that a detail of them may be as well omitted. It may, however, be observed here, the land in this experimental field was of uniform texture and quality throughout, as is generally the case with spaces of sandy land over sand rock bottom. Such a soil is considered to be well adapted for experimental practice, being generally poor, and ready to shew the effects of the manures applied to it in such different degrees as will distinctly shew their action.

In all the foregoing experiments, artificial manures, without the help of dung, appear to have been as productive as with dung. The results produced by dung, by which was meant farm-yard manure, disappoints expectation when comparing them with returns from artificial fertilisers, such as those appealed to lot 4th and 5th of the foregoing series of experiments. Farm-yard manure would no doubt shew better effects on the grain crops, even if applied direct—at all events, it appears the turnips can be raised by artificial manures as well without dung as with [illegible] may be thought the [illegible] [illegible] ed with 10 lb [illegible] ed sulphur [illegible] 50 lb. burnt bones dissolved [illegible] of sulphuric acid, all mixed [illegible] bushels sawdust cost £2 per acre. Produce, 20 tons turnips. Tl manure in this instance was altogether wh may be well called artificial. The sawdu would, in combination with the other m terials, be acted upon by them and serve t make up for the deficiency of vegetab matter in a soil so poor as this is stated t have been.

All the foregoing experiments were mad on poor soils, and the amount of manu not liberal, which two considerations brin out more prominently what mineral or artif cial manures are capable of, as turnip manur without being in combination with dun From better soils the returns would no dou have been greater with the same treatmen It is contended, therefore, that dung nee not be expended on turnips in aid of artific manure, and that the farm-yard manu would be more profitably expended on th corn crops direct.

Farmers have often experienced di appointment in the results of the appl cation of mineral manures for whea Such disappointments have arisen fro it having been omitted, or forgotten be considered, whether the soil contain sufficient nitrogenous matter in its veg table mould. A soil with a low amou of nitrogen in its composition will not yie a good crop of wheat from mineral manu such as superphosphate or bones. Dur according to the amount of ammonia it co tains, supplies nitrogen to the soil, ammo being a compound or composition produc by the mixture of nitrogen and hydrog gases. Besides supplying ammonia, dung [illegible] its the waste of the vegetable remains, a [illegible] keeps up the surface soil to a proper c [illegible] of organic and inorganic proportio [illegible] action of mineral and vegetable s [illegible] on each other in the soils, the eleme fertility are formed, ready to be taken the roots of plants. The grain of wh contains a large amount of nitrogenous mat in the form of gluten and albumen, and ph phorus and potash constitute a large porti of its ashes. Wheat must find these in t soil; abundance of the one will not comp sate for deficiency in the others. If t nitrogen in the soil is so small as only to require half the phosphates or potash to work together with it, the other half remains dormant or inactive. The result is only one-half what it might have been if the plant had found more nitrogen. The following experiments will shew the prompt action of ammonia. They were made on land that had been reduced by repeated cropping without manure, to ascertain its lowest produce without manure, or what might be considered its natural produce:—

Lot 1, 1 acre, no manure. Natural produce, 16¾ bushels.

Lot 2, Manured with 350 lb. superphosphate of lime, and 210 lb. phosphate of magnesia. Produce, 16½ bushels, 1116 lb. straw.

Lot 3, Manured with 350 lb. superphosphate of lime, and 375 lb. phosphate of potash. Produce, 16¾ bushels, 1160 lb. straw.

Lot 4, Manured with the ashes of 14 tons dung. Produce, 16½ bushels, 1104 lb. straw.

Lot 5, Manured with dung, 14 tons. Produce, 22 bushels, 1476 lb. straw.

Lot 6, Manured with 350 lb. superphosphate, and 65 lb. of sulphate of ammonia. Produce, 21¼ bushels, 1368 lb. straw.

Lot 7, Manured with 350 lb. of superphosphate, and 80 lb., instead of 65 lb., of sulphate of ammonia. Produce, 26¼ bushels, 1772 lb. straw.

Lot 8, Manured with sulphate and muriate of ammonia, 2 cwt. Produce, 31¾ bushels, 4266 lb. straw.

These experiments shew no increase over the natural yield without manure by the application of the phosphates to the land, neither do the ashes of the 14 tons dung shew any effect, although containing all the minerals of that quantity of manure. The 14 tons dung, from containing its ammonia, enlarged the production over the natural yield by 5¼ bushels grain and 380 lb. straw. 65 lb. sulphate of ammonia added to the superphosphates increased the produce by 4¾ bushels grain and 250 lb. straw, and the increasing of the sulphate of ammonia to 80 lb. gave 10 bushels grain and 650 lb. straw more than the superphosphate alone. But mark the great increase in the eighth experiment. It was made on Lot 2 of the foregoing series of experiments, manured with phosphates, which gave no increase that season; but being liberally manured the next ensuin season with sulphate and muriate of ammoni the return of grain was double the natur produce, and four times that return of stra This is a large return considering the pr vious state of the land.

Experiments made on good land, in goc condition, cannot be expected to shew resul so distinctly as those on soils that nee manure, and will not give a tolerable crc without it. From the foregoing consideratio it might be a question whether it would n be more profitable to expend the farm-yar manure on the corn crops, and raise gree crops by artificials.

It has been shewn that grain crops requi to find their nitrogenous elements in the soi It has also been made apparent that gree crops, especially turnips, have the power, t their leaves, of obtaining such elements fertility from the atmosphere. The turni will take the good out of dung manure if finds it readily in the soil. It will grow fa and not leave over-much for the crop th follows, and if it finds none, it will grow, neve theless, if there have been mineral manur applied to the soil, of a suitable sort for i growth. But wheat must find its nitrogen i the soil. The ammonia of the dung, if it w applied direct, would be more likely to act o wheat towards causing it to produce a fu growth of straw and grain, than after th dung had been partially exhausted by a gree crop. A good crop of wheat can only be o tained from soil that contains nitrogen in th composition of its vegetable mould, and i proportion to its richness in nitrogen, so wi the growth be full or scanty. Farm-ya manure is supposed to contain all the su stances of which plants are made up. It the most legitimate and natural manure; b the plant only takes into its circulation suc elements of manure as are, or have become, i the earth, soluble in water. Ammonia is o of those elements, and one that happens to t the most essential to vegetation. It is ve volatile, and soon rises into the air out of th dung or urine, and is dissipated away; but may be fixed by combinations with acids a other substances. Sulphate of ammonia is a compound of sulphuric acid and ammonia, by which it becomes fixed or not volatile. A very little acid fixes the ammonia in the urine of cattle, say 1 lb. weight of sulphuric acid to 60 gallons of urine. It has been estimated that the urine of a cow in a year is worth, to a farmer, about 40s. as manure, if collected and from time to time poured upon the land. It is waste to allow the urine of the byre to run away into the drains. It could easily be made to run into an outside pit or tank, where acid could be put in to fix and prevent the ammonia from being volatilized, and when the pit or tank becomes full it could be pumped up into a puncheon and carried out to the land, the cost for acid would only be about a half-penny per week per cow, say that she voided about 4 gallons a-day. The manure in the farm-yard might be watered with diluted acid to fix its ammonia, which would otherwise be vapourized and lost. Wheat is a nitrogen-requiring plant, and it might more readily benefit by the ammonia of the dung if applied to it direct than after a green crop had used up part, at least, of its virtues. The land by this system would still get all the manure made on the farm. The amount of straw would be increased, followed by an increased amount of yard manure.

It is not expected that the effects of the various artificial manures, as exemplified by the experiments herein set down, will be found by farmers to be altogether new to them. There are plenty of books on agricultural chemistry which treat on the subject of artificial manures at great length. But as such works are generally long extended, and embrace many subjects [illegible] interest to practica[illegible] prices [illegible] [illegible] surveyor [illegible] considered [illegible] others as well as his own; there[illegible] marks and observations on the experiments that are here set forth need n be taken as those of a speculative inexper enced party. The experiments are selecte from trustworthy authorities. The remarks o them are the writer's own, and will of cours be only estimated at what they are considere worth.

In advocating the application of the farm yard manure direct to the wheat or othe corn crops, it was observed that wheat was nitrogen-requiring plant, and thrived best o soils containing nitrogen naturally, as som rich soils do, in sufficient quantity to giv good crops year after year without manure Such soils are found in various parts of th world, and they must have the power absorbing nitrogen from the atmospheric ai or otherwise they would in time becom exhausted. But when it is considered tha common air is in great part made up of nitro gen gas, and that rich soils are porous an full of air in their cavities when loosened b cultivation, the absorption of that gas to for nitrates in the earth may be inferred as natural process, like others that are bett known. The nitre beds by which saltpetr was used to be obtained for the manufactur of gunpowder may be instanced as an art ficial process, by which earth, after bein mixed up with vegetable and animal remain and formed into beds and left for a year two to the action of the elements of the ai were found to produce saltpetre, or nitr by the nitrogen of the air in the cavities the earth combining with the potash of th soil and dung, and forming nitrate of potas The earth of such beds had only to b washed with water, and on the water bein evaporated, the nitrogen was found a saltpetre. What was observed to be remar [illegible] process was the earth, after bein washed [illegible] was ready to form saltpetre a before [illegible] used to be cast over for th purpose on to the other side of the bed fro which it had been taken to be washed. Ma [illegible] the giving of dung to the land for the whe crop put the soil in a condition to for nitrates, as in the nitrate beds? and, as th natural process requires time, the dunging

ınd in autumn for the wheat would be
r favourable that it would be nearly
months in the earth before the plant
l arrive at its strongest and seed-forming
h. But these considerations are specu-
only, and are advanced merely to give
ea of how organic and inorganic mate-
applied as manures, may be conceived
t on each other in the soil towards pro-
g the elements of fertility that plants
re to find by their roots.

few of the effects of nitrate of potash
ıave a place here, applied to wheat.

acre dressed with 1 cwt. gave 27 bushels, un-
l 18½; an acre dressed with 1 cwt. gave 43
s, undressed 23; an acre dressed with 1 cwt.
3 bushels, undressed 26; an acre dressed with
gave 54 bushels, undressed 42.

ate of Soda on Wheat.—1 acre dressed with 1
gave 54 bushels, and 38½ cwt. straw; do. not
l, gave 32 bushels, and 34 cwt. straw. Gain by
ıg, 22 bushels, 4½ cwt. straw. Land dressed
cwt., gave 20 bushels, 25¾ cwt. straw; do.
essed, gave 14¾ bushels, 18 cwt. straw. Gain
ssing, 5¼ bushels, 7¾ cwt. straw.

ate of Potash on Wheat.—Land dressed with
. gave 42 bushels, and 76 cwt. straw; do. not
l, 35 bushels, and 31 cwt. straw. Gain by
ıg, 7 bushels, 45 cwt. straw.

ate of Soda on Barley.—Land dressed with 1
gave 55½ bushels; do. not dressed, gave 44½
s. Gain by dressing, 11 bushels. Land
l with 1 cwt., gave 59 bushels; do. not dressed,
hels. Gain by dressing, 12 bushels.

dry Manures for Wheat.—No manure gave
ush.; 30 loads dung, 40¾ bush.; 3½ cwt.
an guano, 40¾ bush. (cost of manure, 42s.); 5
pe dust, 38¾ bush. (cost of manure, 32s. 6d.);
t. superphosphate, 53½ bush. (cost of manure,

ate of Soda for Clover Hay.—Dressed with 4
tons 4 cwt.; not dressed, 2 tons 12 cwt. (gain
ssing, 12 cwt.) Land dressed with 4 cwt., 3
ıd ½ cwt.; not dressed, 2 tons (gain by dress-
ton and ½ cwt.) Land dressed with 160 lb., 2
cwt.; not dressed, 1 ton 6 cwt. (gain by dress-
cwt.) Land dressed with 112 lb., 3 ton 18 cwt.;
ssed, 2 ton 10 cwt. (gain by dressing, 1 ton 8 cwt.)
d dressed with 1 cwt. each of nitrate of potash
da gave 2 tons 3 cwt.; not dressed, 1 ton 1 cwt.
y dressing, 1 ton 2 cwt.

hate of Ammonia for Potatoes.—Dung alone
2¾ tons; 1½ cwt. sulphate of ammonia added,
ons; 1¼ cwt. sulphate of soda, 12¾ tons;
t. sulphate of soda, and ¾ cwt. of sulphate of
ammonia added, 18¾ tons. Gain by the mixture, 6 tons.

The absence of any increase in two of these last experiments by the addition to the dung of sulphates of soda and ammonia disappoints reasonable expectation, and can only be accounted for by supposing the dung could not act with either of them separately; but when the two minerals were added as a compound, they added to the produce given by the dung the amount of produce they would have given had they been applied to the land without any other manure along with them, that is to say, the 1½ cwt. soda, and ¾ cwt. of ammonia combined would have probably produced 6 tons. Compounds are always more certain in their action.

It has been herein previously shewn that superphosphates and other minerals conjoined have failed to produce any increase, in some instances, from the want of ammonia in the soil, even when given liberally; but by adding ammonia for them to work along with, the effects were satisfactory if not surprising. Many disappointments have no doubt been experienced at the non-effect of expensive trials of mineral and other artificial manures. Some of such manures act singly in a favourable manner in some conditions of soil; whilst in soils that are poor in the nitrogenous elements of vegetation, inorganic substances have little effect. Superphosphate alone has been found to produce admirable results on some soils, in many others the increase from its action has been *nil*. The rule should therefore be to apply artificial manures in compounds having ammonia or nitrogen in some form as part. Taking into consideration the various constituents found by analysis as forming the full grown plant, and those found in its ashes in particular, we come to judge what substances a crop may have taken from the soil, and so be enabled to consider what substances would best restore them to it again. Or, for instance, if land has produced 40 bushels per acre of wheat, what sorts of stuffs should be put into it in order to make it give a similar amount of crop? Having these considerations in view, the following has been calculated as special manures :—

Special Manure for Wheat to replace the Mineral Matter of a previous crop.

Bone dust..................	180 lb. dissolved in
Sulphuric acid............	90
Potash	30
Carbonate of soda........	20
Do. of magnesia......	70
Total ...	..390 lb.

5 bushels of wheat carry off 6 lb. of inorganic matter. For every bushel carried off, 5 lb. of this mixture falls to be given, that is about 2 cwt. for a crop of 40 bushels per acre. It may be made for about 10s. per cwt.

Special Manure for Barley.

Bone dust......................	150 lb.
Sulphuric acid................	75 ,,
Carbonate of potash	18 ,,
Do. of soda	14 ,,
Do. of magnesia ...	16 ,,
Total	275 lb.

200 lb. of this for a crop of 50 bushels per acre.

Special Manure for Oats.

Bone dust	88 lb.
Sulphuric acid	44 ,,
Carbonate of potash...............	18 ,,
Do. of soda....................	10 ,,
Do. of magnesia...........	14 ,,
Total...............	174 lb.

105 lb. of this for a crop of 50 bushels per acre.

It is to be observed that a large proportion of the bones (more than one-third) consist of cartilage, which is a nitrogenous substance, highly fertilizing and capable [illegible] the place of so much [illegible]

14 [illegible] every [illegible] bulbs, of [illegible]
[illegible] of both bulbs and tops

Ingredients in 100 parts of the ashes of the undernoted plants.

	Potash and Soda.	Lime.	Mag.	Phos. acid.	Sul. acid.	Silica
Wheat.....33	per cent.	3	12	50	0.25	1
Barley.....22	,,	3	7	39	0.10	27
Oats 26	,,	6	10	44	11	3
Beans......44	,,	6	8	38	1	1
Peas 44	,,	5	8	33	4	0.51
Potatoes...57	,,	2	5	13	14	4
Turnip....47	,,	14	5	8	14	8

The preceding special manures are calculated so as to replace in the land the minera substances taken from it by the stated number of bushels of produce per acre of th crop it had yielded, or if the land is wishe to produce a like quantity, these specia manures will put it in a condition to do so in as far as the mineral requirements of th crop is concerned. But it has been state that plants require to find nitrogen or ammonia in the soil. The bone manure a stated, supplies in its cartilage a considerabl portion of nitrogenous substance, sufficien in fact, to produce a tolerable crop of turnip without other aid. The addition to th special manures of ammoniacal salts in jud cious proportion would all but insure th proposed or wished-for amount of return grain per acre.

The field formerly described as having bee reduced by over-cropping for the purpose being experimented upon, gave no increa over its natural produce without manure b the application of minerals alone, but the a dition to them of ammoniacal salts double the natural produce of grain, and quadruple the return of straw. This field, which ga without manure a yearly return of 16 bushe of wheat on being tried with turnips witho manure gave hardly any crop at all; th [illegible] as big as radishes. On the oth [illegible] has been shewn that bones or supe [illegible] gave a tolerable crop of turni [illegible] effect was produced by them c [illegible] By burning or calcining bones th [illegible] in them, forming one-third of the [illegible], is destroyed. Bones are sometim calcined to liberate their phosphorus, an make it more ready for action as manur But dissolving bones in sulphuric acid is preferable mode of applying them, by which none of their fertilizing qualities are lost, whilst, at the same time, one of the mineral ingredients, viz., sulphur, which is always found in the ashes of plants, is added, besides a lesser quantity of bones so dissolved will suffice to produce the proposed effect. Two by weight of water to one of acid is the proportion. In this liquid the bones will dissolve in a day or two, when it can be mixed up with ashes or dry earth, and fitted to be spread in the drills or scattered broadcast, and harrowed or rolled in.

Average results of numerous analyses of the undernoted sorts of guano :—

	Water. per cent.	Organic matter and ammonia. per cent.	Phosphates. per cent.
Bolivian -	5 to 7	56 to 64	25 to 29
Peruvian -	7 ,, 10	50 ,, 56	16 ,, 23
Chilian - -	10 ,, 13	50 ,, 56	22 ,, 30
Ichaboe - -	18 ,, 26	36 ,, 44	21 ,, 29
Saldanah Bay	17 ,, 34	14 ,, 22	45 ,, 56
South African	14 ,, 15	19	5 ,, 22
Halifax Island	25	21	23
Australian -	18	20	30
Holmes Island	24	39	25

Any of the quantities of the undernoted substances contain as much nitrogen as 1000 lb. of ordinary farm-yard manure :—750 lb. of turnip or potato tops, 760 natural grass, 750 fresh sea weed, 220 pea straw, 1700 wheat straw, 1400 oat straw, 1750 barley straw, 2500 fir sawdust, 300 dry seaweed, 250 clover roots, 300 coal soot, 80 lint or rape dust. Thus, rape dust is thirteen times as rich in nitrogen as dung. Observe, it is simply impossible that any portion of the solid matter of dung or any other manure can enter into the circul tion of plants in the solid form. The fertili ing matters in manures must already be or b come soluble in the soil, so as to be taken by the roots. How admirable are the wor ings of nature even in its minutest processe If the growth of the seed in late sown ground be examined, by turning ov a little of the earth with the finger, grain will be found vegetating, and whic has pushed forth a tissue of film-like roo into the dry and powdery earth, some of th hair-like filaments running into and throu little lumps and knobs of the soil. If th grain thus found be lifted up, the roots w be seen hanging to it like a tassel with knob and grains of earth and sand attached, *saturated with water*, and glancing in th sun, although taken out of the dry, harrowe powdery soil, none of which will be four wet except what is in contact with, or attach to, the roots. Whence came the water in dry a bed? Is it the attraction of affini which the roots may have for the water of th atmospheric air within the soil, enabling the to draw and condense the air into water their surfaces, or is it that the organism the young plant has the power of appropria ing the nitrogen gas of the air, leaving th other two elements,—viz., oxygen and hydr gen, to form a different combination, whic combination, as is well known, constitut water? Either of these arrangements of th All-wise for the nursing of the infant plan how admirable! The works of God a awfully wonderful in the minute as in th magnificent.

THE PREPARATION OF THE LAND FOR WHEAT.

WHEAT, with proper management, may be grown upon almost every variety of soils, but those which are clayey in their nature are the best. Heavy lands of this character are, in fact, generally classified as wheat or bean lands, in contradistinction to the light loamy soils, which are termed turnip lands. In all soils, and markedly in heavy tenacious ones, thorough drainage is an esse tial element to success. Another element the complete cleaning of the land from weed such as the plague of heavy lands, the couc grass (Triticum repens). As this cannot properly done in the brief periods when th land is free during the growth of green crop heavy lands are subjected to "bare," "naked or "summer fallows," as by these different names the system is known. Independently of the time which the system affords for thoroughly getting rid of the weeds, it offers another and a great advantage in allowing the atmospheric influences to act upon the soil, decomposing its parts, and bringing it into the condition best calculated to nourish the plants. The work of summer fallows will now by this time be finished, the last process being the ploughing of the land into ridges; these should be narrow, to enable them to be covered with one turn of the harrows, the horses walking in the furrows. The land thus ploughed should not be touched till the period of sowing. In some cases the weeds have grown so thick as to necessitate the use of the horse-hoe, the harrow being found ineffectual in removing them; in ordinary cases, the plough will be found efficient for their removal. The condition of the soil at the time of sowing is a matter of great importance; it should not be too dry, so as to be dusty, but moist; indeed, some authorities maintain that the soil cannot be too wet, so long as it works kindly, and covers the seed easily. The danger in such a condition, however, is that the pouching of the horses' feet will injure the soil, and form holes, in which the rain will collect and remain for a long time. A moistish soil will be better, therefore, than a wet one, or rather, one over moist. Harrowing after the seed is got in should only be lightly done, sufficient merely to cover the seed, not to make the surface smooth. This making of the surface smooth is a great mistake in practice, for succeeding rains only tend to make the surface of the smooth field a crust or cake, which materially hinders the growth of the plants. A rough condition of soil is unquestionably the best, as shelter is provided for the young plants behind the clods or lumps, and these, by the action of the atmosphere, will melt down, as it were, affording in spring a fine tilth for the nourishing of the plants. Over harrowing, and we will not say rolling, shoul therefore be avoided after the sowing of th seed.

In medium heavy or clay lands the bar fallow is dispensed with, and a green c fallow crop is taken before the wheat. O the crop being removed, the land is at onc ploughed up, a single ploughing being generally all that is necessary, except in cases wher the soil is very hard and baked, and tw ploughings may be required. There i danger, , however, in making the land to light by this process, the wheat plan requiring a consolidated soil. When beans have been the preceding crop and the land properly worked and kep clean during the period of their growth, al the preparation necessary in autumn fo the wheat crop is simply harrowing; thi holding more specially true in the case c rich deep loamy soils, on which, by the way in some districts, alternate crops of whea and potatoes are taken for a long course c years, the potatoes being highly manured If land of this character contains a good proportion of clay, alternate crops of wheat an beans may be taken for several years.

On light soils, the wheat is generally take after the clover, the roots of which ten to give the consolidation to the soil whic the plants require. Clover, indeed, is th best crop to precede the wheat in lands c this nature; but where objected, as it is ofte objected to, and the wheat follows a gree crop, the greatest care is necessary to secur the consolidation of the soil. The green cro is, therefore, usually eaten off the land by sheep the land is then ploughed and press rolled, afte which, if not well consolidated, sheep may b turned in with great advantage. Where clove has been the preceding crop, the furrow turned over by the plough should be allowe to lie for a short time before further work i proceeded with. To keep down weeds, it i advisable to use a skim coulter to the plough which will give the furrow a much neate appearance than when not used.

WHEAT AND WHEAT SOWING.

THE season for the sowing of the most important crop of the farm being now rapidly approaching, it will be well to glance at a few of the points connected with the subject, which carry, or are likely to carry, with them some matter of practical or suggestive utility.

The first point which comes up before us is, naturally, the selecting of the variety to be grown upon the farm. And here it is to be noted, that the point to be had in view is the choice of a variety suited for the particular soil, climate, and locality of the farm. Grievous mistakes are often made by choosing a variety, the merits of which are most industriously trumpeted forth by those who have an interest in their sale; and although the choice is made, not simply on this ground, but because the grain itself looks exceedingly well, and is apparently of first rate quality, which, in point of fact, it may be *per se*, still, from the circumstances connected with the soil and locality in which it is to be grown not being taken into account, disappointment as to threshing results often follows. It does not follow, therefore, that a fine plump-looking fine-skinned grain will be the best to choose for sowing; it may prove to be the very worst, and greater satisfaction may be obtained from a grain which does not look so well. To the confidence, or assumed confidence, which an inspection of a sample of grain may give to the intending purchaser, he should add a knowledge of the peculiarities of the plant when growing, and of the soil and locality in which they have been cultivated. To this end the best mode is personally to inspect the fields where the variety is growing from which they wish to obtain seed for sowing, or, failing this, to have the opinion of some trustworthy friend who has a knowledge of the habits of the variety, and of the soil to which it is best adapted.

In view of the difficulties attendant upon the securing of a variety really true to name and stated qualities, some farmers p fer to venture growing that variety which th are acquainted with, and which is best adapt to their locality and soil. But there is danger arising, or a danger is apt to ari from this habit, for it seems to be pretty w established that a change of seed is a go thing. From what is the experience of a gre number of practical men, it appears to be tendency of the wheat plant to degenera not only as regards its quantity, but quali If so, the value of the change-of-seed syste will be easily perceived. The difficulty oft is, what is the kind of change to mak This question is, like many others co nected with the practice of farm cropping, ve much undecided—little attention being giv to it by scientific men or by our agricultu societies. The points involved are mo numerous than would at first sight appear, b to those the space at our disposal preven us from making even the briefest allusio We can only find an answer, or approxim tive answer, to the question as put, by not ing satisfactory trials which have been corded. We note, for example, one ca when the party occupying two farms—one wi a retentive clay, the other with a thin loa upon a sandy subsoil—found it to produ excellent results to change the seed whe every year from one farm to the other. change from a wet or cold climate may be taken as one which will almost be sure fail; it being altogether a much safer plan change from a wet or cold to a dry and war locality—changes from soils of opposite qua ties are apparently good.

Much may be done in the way of obtai ing new varieties, by the farmer inspecti carefully his own fields, with a view to sele those samples which are the most strikin from their good qualities. Whether this i spection would result in giving an absolute new variety or not, still there is no doubt this, that the best samples of the variety under cultivation would be obtained, and this would be no small gain. The samples thus obtained should then be sown, and the results carefully noted. These remarks bring us to the mode of improving varieties, or the finding of a new variety on the principle of selection, so warmly advocated in theory, and carried out so extensively in practice, by Mr F. Hallett, of Brighton, whose "pedigree" wheat is so well known. The principle of this system briefly stated is, that the wheat plant requires a mode of culture specially adapted to its peculiarities and habits, and when so cultivated by repeated and careful selection of the seed, a variety may be produced which has a "pedigree," and the contents of the ear of which may be increased without, in any way, diminishing their numbers. This is something different from the selection of ears accidentally growing in the field, and to which we have above alluded, and assumes, as a point of high importance, the starting with a variety of good quality, and gradually, by the mode of culture and repeated selection, improving it. It need scarcely be said that this "pedigree" principle is denied by many and first-rate authorities; those holding that more cultivation—in its ordinary forms—will not effect a change in well-defined kinds; and that the true way is to select those new and valuable varieties which are produced accidentally, as it were, in fields, and to the looking for which we have directed the attention of our readers as a practice worth the following up On the point of pedigree, as against the view, we may be permitted here to repeat what, in another [illegible] both si[illegible] [illegible] under careful treatment up to a certain point, after which the improvement ceases, and degeneration frequently ensues. The maintenance of an improved quality is probably a much more difficul matter than the introduction of one. I growing seed from carefully selected ears o wheat, we have not found so direct an im provement in the succeeding crop as we wer led to expect; on the contrary, the see from very large ears did not maintain it character, but produced smaller ears. Som maintain that the best way is to grow fron inferior ears, and trust to careful culture fo an improvement. It is probable that mor immediate results of a satisfactory kind wi be obtained by so doing, than by trusting t the more elaborate, yet more tedious metho of selection. We have two ears before us— samples of two plots—one, which is a thir larger than the other, belongs to the plc which had the most advanced treatment c the day given to it, the other to that whic was left to itself, in the "let-alone" systen too often prevalent. One has but to look a the two to note at once the marvellous di ference between them.

We have now to refer to the opinio which has been advocated by some, th it is a good practice to sow a mixture c a variety of seeds, this not only on th ground that the produce is more valuabl but because it is one of the most efficient mea known to prevent the grain lodging or fallir at an advanced period of its growth. On th first of these points we may here recor our belief that it proceeds from an obvious wrong consideration of the habits of the plan There can be no advantage, but disadvanta rather, in sowing varieties which come int flower and ripen at different periods. This latt point is indeed a fatal objection to the plar for while some varieties would be mature others would either never mature at all, or b not properly matured. It may be taken as a maxim that it will be for the interest of th farmer to grow that variety which will ripe and produce a flour as uniform in quality a possible. If mixtures are required, as the often by millers, it is obviously the be plan to mix the different varieties, all o which have been sown, matured, and cut i the usual way.

The variety of seed to be sown being d

cided upon, the next point is its preparation in order to prevent the attacks of that disease commonly known as the "smut." When it is remembered that the spores of the fungi which produce the smut, enter the plants by the spongioles of the root, the necessity for using clean wheat will be at once seen. The modes of securing this are pretty numerous, the object in all being to use a liquid which will easily act upon the spores, which are of a greasy adhesive nature. Alkaline mixtures are therefore used. Thus, strong brine, lime, urine, and chemicals, such as sulphate of copper, are amongst the mixtures commonly used. Some special mixtures are employed, such as that known by the name of "Down's Farmers' Friend," in which sulphur is the chief ingredient. The following notes on this subject of steeping wheat, as the process is termed, will be here useful:—

One method practised, is laying the seed thinly on the floor, sprinkling the brine (or cattle urine, as is sometimes used), of a density with salt to swim an egg over the mass. Thus, layer of wheat and sprinkling of the pickle to the quantity wanted for one time, or day's sowing, and making it dry for sowing by mixing with it a sufficient quantity of lime. Another way is to empty the grain into a tub of brine, stir, and allow to settle; then all that floats is skimmed off, the brine is drained off, the wheat emptied upon the floor, and it is dried with lime.

A third method is as follows:—

For every sack (of 4 bushels) of wheat prepare 3 gallons of brine, either made of salt or salt-water, but of sufficient strength to swim or support a new-laid hen's egg, and into such stir in 1 gallon of slacked lime, then spread the wheat over a clean floor, add the preparation, thoroughly turn it (at least four times) to moisten every grain, and which should be done the day previous to drilling or sowing, and in the event of the weather suddenly changing, it can be safely sown even for weeks after.

The following is a description of the mode of using sulphate of copper, or blue vitriol of commerce:—

Four lb. of the vitriol should be dissolved in about 2 gallons of boiling water, and, when fully dissolved, placed in a large tub—an old hogshead cut through the middle answers the purpose very well—and add about 20 gallons of cold water. Procure a wicker basket of suitable shape to go into the tub, large and strong enough to hold a bushel and a-half of wheat; place the basket in the liquid, and gently pour into the wheat. By adopting this precaution the light ai imperfect grains, chaff, or small seed, wil float at tl top, and may be skimmed off the surface. Havii proceeded thus far, lift the basket and allow it to dra over the tub ; empty the same, and proceed with t next lot. This method will be found very convenie as well as effectual ; but the most effectual reme consists in selecting a good, clean, and even samp for seed, from a climate suitable for a change, wh each kind of dressing will be found to answer t purpose.

It has been the habit of late years to u arsenical and other poisonous substances ar compounds for the dressing of wheat, and good deal has been said upon the danger ari ing from these substances. Although muc more has been said about this than fac warrant, still it will be the wisest plan not use them ; all the more, that innocuous su stances can be used with equal effect. Som indeed, maintain, that the object being simp to cleanse the wheat from the adhering spore all that is necessary is, to wash it in cle water, leaving the light seeds to swim to tl top, and rejecting these as seed. But seeii the oily adhesive character of the spores, tl addition of an alkali will certainly be an a vantage. Hence, some strongly recommer the use of nitrate of soda, which, in additic to acting as an alkali, acts, or is supposed act, in another and more beneficial way, th as a fertilizer, tending to hasten the germin tion of the seed. And the mention of tl here reminds us of the objection whi has been taken to the use of lime in dressii or steeping wheat. Many use lime, simp as a medium for drying the wheat after beii steeped in brine, urine, or other liquid ; bi if used alone for this, it will be better to u another substance, as gypsum, which is equally efficacious as a drying material, ai less noxious to the hands than lime, the o jection to which is, that it has an injurio action upon the germinating powers of tl seed. Others think that the objection groundless ; but seeing that the use of lime not, or appears not to be indispensable, it as well to take advantage of the doubt i specting its use, and employ some other m terial.

CHANGING THE NATURAL CONDITION OF SOILS.

A WRITER in a mechanical journal in an article on the progress of agriculture, expressed an opinion that farmers would yet be much indebted to the aid of the contractor and the "navvy," in helping to reduce the inequalities of land, levelling the rising ground and filling up the hollows, and this with a view not only to facilitate horse-power, but many of the operations of mechanical farming, such as drilling the seed and reaping the corn, and, above all, in making the application of steam-power to the culture of the soil more easy, and therefore more widely applicable. So far as the latter is concerned, we have long advocated this view, that the steam-engine could not and would not be made generally available, not merely for ploughing or cultivating, but for a much wider variety of purposes, till the land was prepared to meet—so to express it—the peculiarities of the new power. Not further to discuss at present this theme, which, however, will bear discussion at a more convenient opportunity, we purpose to glance briefly at another direction, in which the navvy, or navvy-like operation, at all events, may be useful to the farmer, Utopian and too go-a-head, as some may think the proposition; and this direction is that indicated in the heading to our paper. When we consider the wide variety of soils within the reach of the farmer—some of which, by their fertility and the ease with which they are cultivated, gladden his heart, and some, from he[illegible] and [illegible] difficulty they p[illegible] to being worked, have the opposite effect—it seems a pity that, while an interchange between the soils would be unquestionabl beneficial, some means should not be a the disposal of the farmer by which tha change may be easily made. There are however, some districts in which th soil is all, or nearly all, of one unvarying character. But in these cases admixture may still be carried out to a limite extent. Heavy clay lands may be judiciousl treated by mixing with the soil the nodule of burnt clay, the cost of preparing which i by no means great—say 6d. to 8d. a cubi yard. But there are many districts in whic heavy clay soils — those which vex th soul of the farmer—may be treated by mixing with them heavy dressings of sand c sandy soil up to as much as 200 tons pe acre. The converse of this is, of cours equally applicable where a sandy soil will b benefited by the application of clay to i This would, indeed, be a literal interchang of benefits, the deficiencies of the one bein made up by the superabundance of the othe Lands in process of reclamation in moorlan districts will be immensely benefited by th admixture of sand and clay, or clayey loan These admixtures are not stated as purel hypothetical, but have been all carried ou with marked success, and have paid the co of the work laid out upon them. We coul say more on this subject, but we intende our paper to serve merely as a "hint," an the hint may be worth having.

[illegible] SUCH A PLANT?

[illegible] and Perennial Rye-Grass [illegible] identical?" quoted from the *Seedsman*, the prevailing opinion that the so-called Annual Rye-grass of cultivators was [illegible] Lolium album of Gerarde and other early English authors was refuted; which nam t was affirmed was applied by them to th Lolium temulentum of Linnæus, or poisonou seeded darnel.

Our remarks have been cavilled at b

some, and contrary evidence attempted to be produced to prove that L. album, or white rye-grass, is the plant known as annual rye-grass; that consequently it is truly an annual, and has always been specifically distinct from the L. perenne of Linnæus.

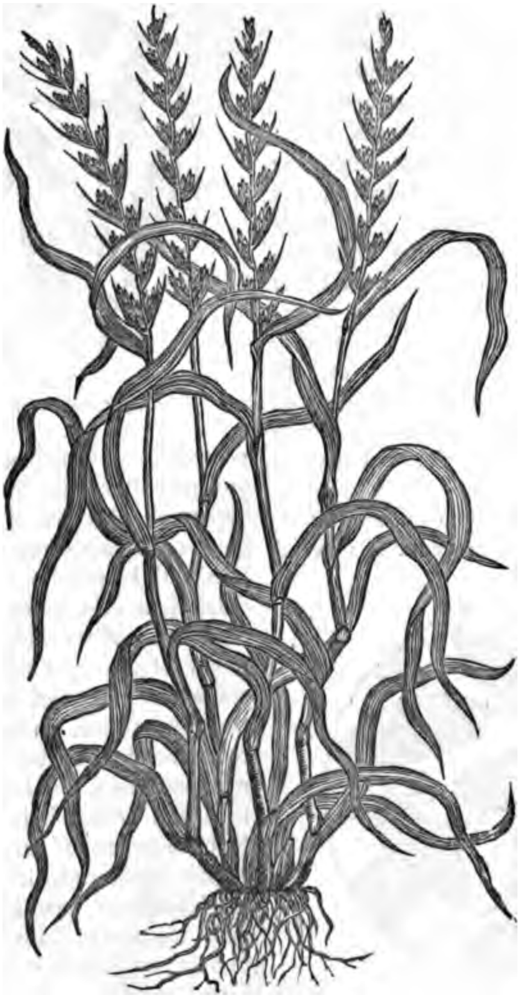


Fig. 1.—Lolium album, or White Darnel of Gerarde.

Without reiterating the reasons assigned by those authors, who, towards the end of the last, and in the beginning of the present century, promulgated the notion that an annual or short-lived kind of rye-grass, identical with Gerarde's L. album, had in some way got into very general cultivation, we proceed to shew, with the aid of the accompanying seri of engravings, that there is no ground wha ever for attributing such an origin to any the cultivated varieties of the common ry grass; all of which have been derived fro the L. rubrum of Gerarde, which, notwit standing assertions to the contrary, is iden cal with the L. perenne of Linnæus.

Fig. 1 is a *fac-simile* of the Lolium albu or white darnel of Gerarde, copied from h "Herball or Generall Historie of Plante 1597; and if allowance is made for t peculiar method practised by the wood e gravers of his time, in, as it were, compressing their plant figures so as to fit wood blocks of uniform size and shape, we have in this a very good illustration of the Lolium temulentum of Linnæus, in which its distinguishing characteristic of the glumes or outer chaff is well shewn. The beards or awns usually attached to the seeds are doubtless deficient, but these are not always prominently present in this species; and the author's description, which is as follows, is perfectly conclusive:—"Among the hurtful weeds darnel is the first. It bringeth forth leaves or stalks like those of wheat or barley, yet rougher, with a long ear made up of many little ones, every particular one whereof containeth two or three grains lesser than those of wheat. Darnel is called of some of the Latines Triticum temulentum. The new bread, wherein darnel is, eaten hot, causeth drunkenness; in like manner doth beer or ale, wherein the seed is fallen, or put into the malt. It hurteth the eyes, and maketh them dim."

That the seeds of L. temulentum (fig. 2) possess all the dangerous qualities here as-

[illegible] prove [illegible] Gerarde [illegible] fig. [illegible] perfectly harmless [illegible] Linnæus says, that the seed of L. temulentum, when mixed with bread corn [illegible] but little effect unless the bread be eaten hot. But if malted with barley, the ale soon occasions drunkenness.

A writer in the *Weekly Review*, vol. 67, p. 559, states that when made into bread with a small proportion of wheat, and eaten repeatedly, it produced vomiting, purging violent colics, and death. And old peopl still speak of its being common in the whea fields of Britain when they were young, an recal with horror the "dear years," when it deleterious effects were too frequently experienced by those who were driven to mak bread of the light wheat, among which it seeds were too often injuriously present. A the present time, when so much is doing, an recommended to be done, for preventin adulterations and deleterious mixtures in ou food and drinks, it is somewhat remarkabl that the poisonous darnel seeds are allowe to pass unnoticed, although they are presen in deleterious quantities in many foreig grain samples of both wheat and barley, an in a cargoe of bere or bigg recently importe from Chili for brewing purposes, we found it [illegible] in the proportion of fully eig

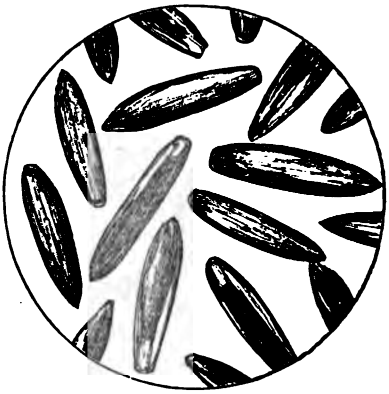


Fig 3.—Seeds of Lolium perenne.

[illegible] a copy of the L. temulentum, i Sinclair's "Hortus Gramineus Woburnensis; and fig. 5 of that in Parnell's "Grasses Britain," referred to in our remarks at p. 43 vol. ii., as having been taken for representations of the mythical annual rye-grass. Sincla also gives a figure, with shorter awns tha

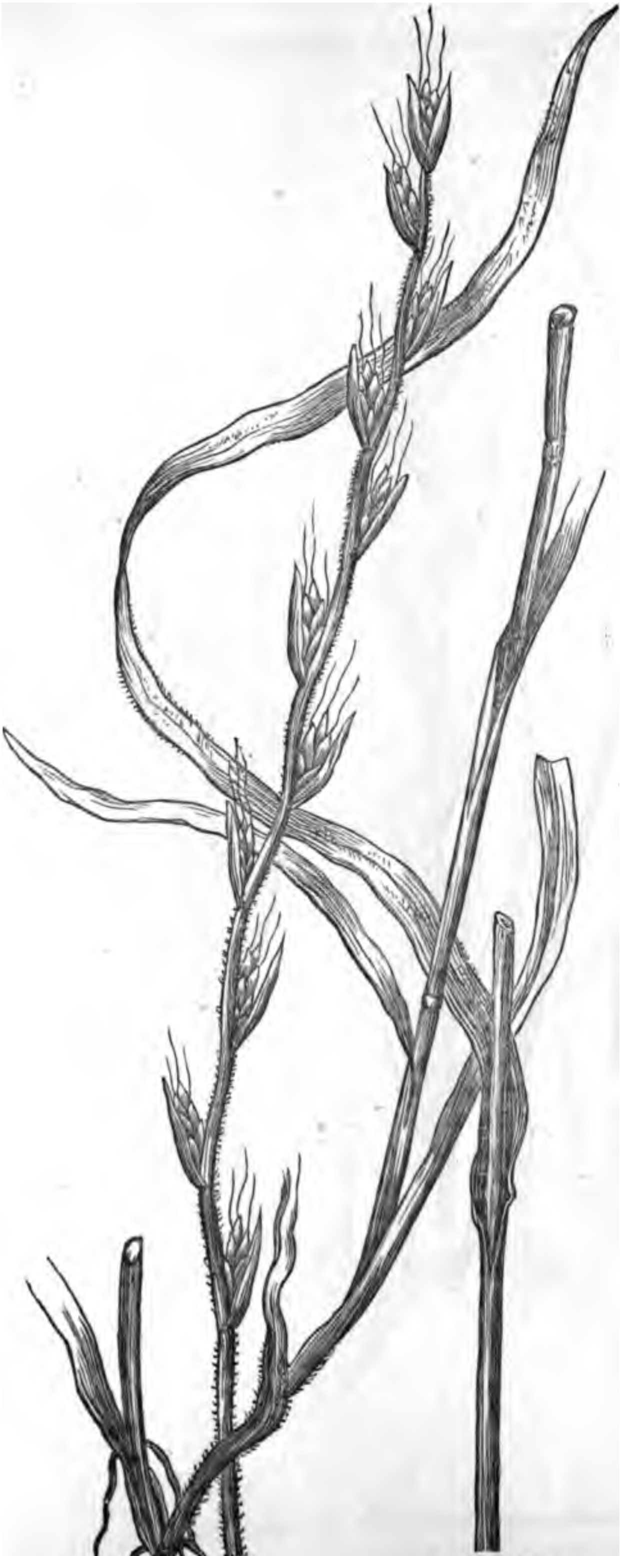


Fig. 4.—Lolium temulentum—From "Hortus Gramineus Woburnensis."

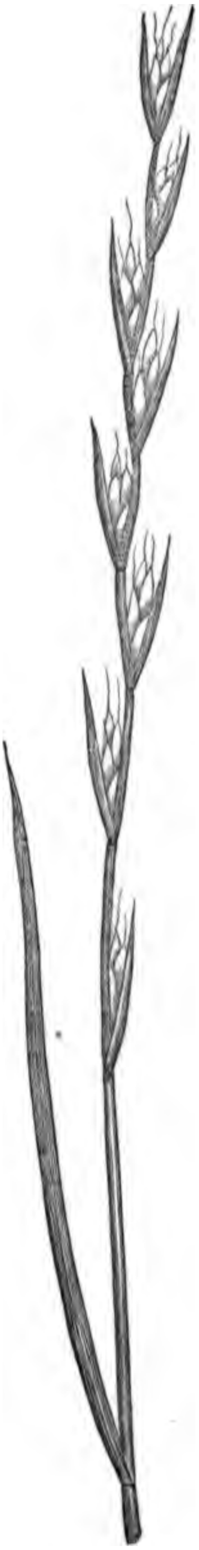


Fig. 5. - Lolium temulentum of Parnel

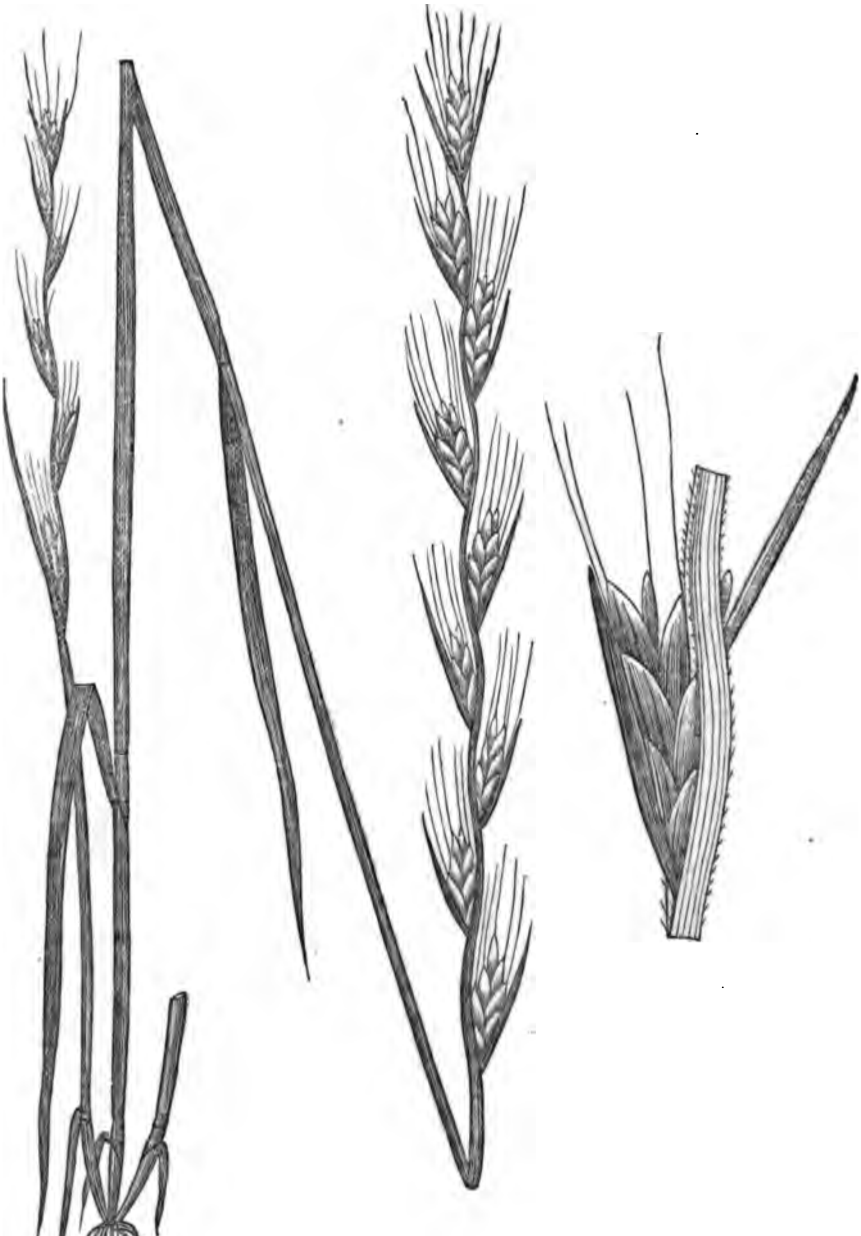
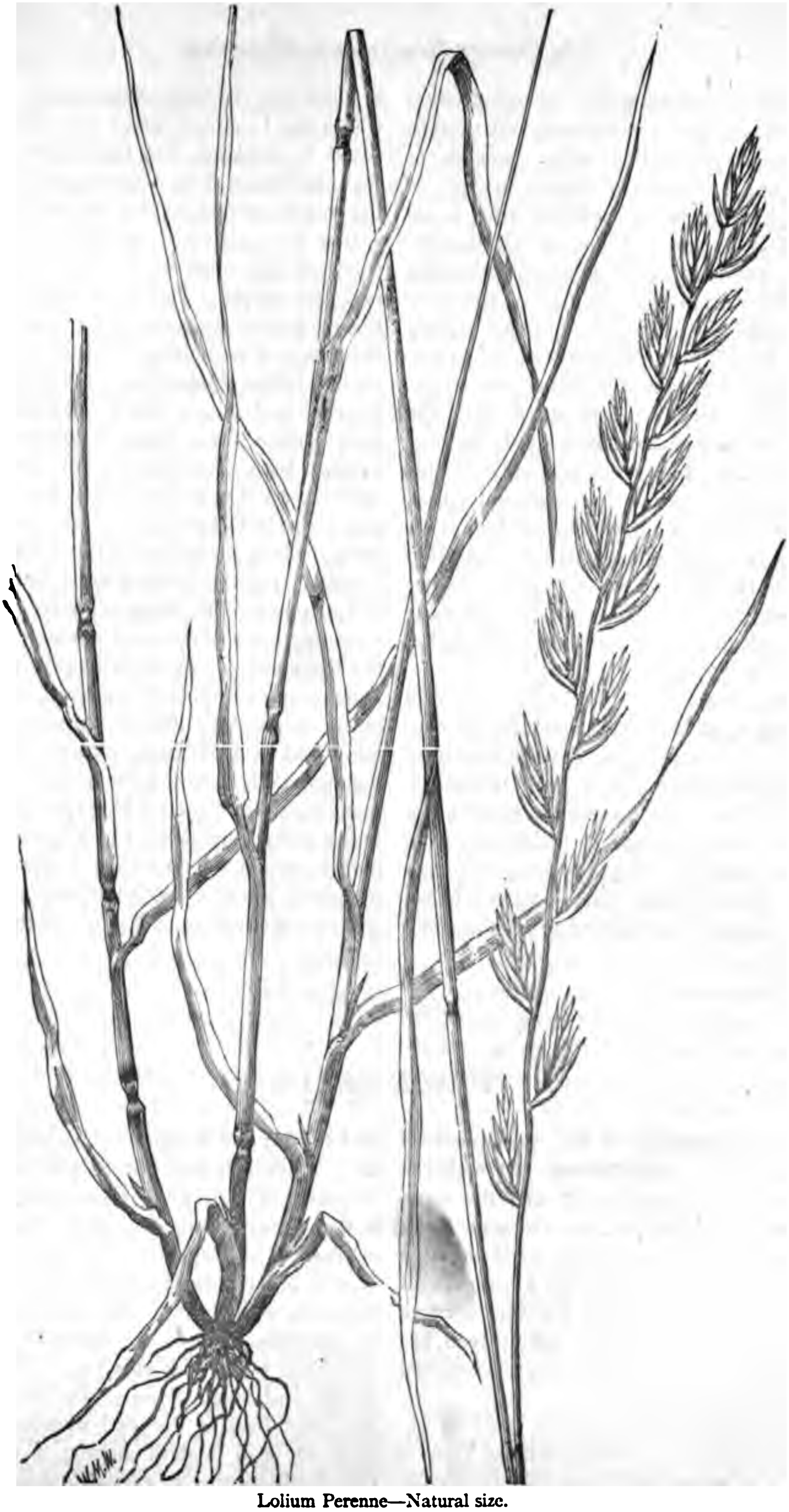


Fig. 6. - Lolium temulentum (var.) longiaristatum of Parnell.



Lolium Perenne—Natural size.

any of the preceding, which he calls Lolium arvense minor, and another with still shorter, or scarcely perceptible awns, named L. arvense major, which is the L. arvense of some British floras, but not the true L. arvense of Schræder. These are all unquestionably varieties of L. temulentum, which merely differ from one another in the relative length of their awns. And seeing that, by the Woburn experiments, No. 4 was found incapable of withstanding our winter frosts, while the two last stood over the severest winters without injury, Mr Sinclair concluded that it was not a native of this country, but may have been introduced in mixture with grain from warmer climates; and, if correct in his conclusions, the presumption is that the two last are the true native forms, and hence the non-representation of their awns in Gerarde's very much reduced figure, is easily accounted for.

Although the L. perenne had the name of L. rubrum applied to it by Gerarde, in consequence of the prevailing reddish colour of its joints and leaf stalks, it by no means follows that these should invariably present the same reddish appearance, for colour in plants is a most varying and unsatisfactory characteristic. Hence, when James Adams, in his "Practical Essays on Agriculture," published in 1789, and contemporary authors, state tha it was the L. album which was chiefly cultivated in England, they must have arrived a that conclusion from observing—if they too the trouble of making any observations at al —that the cultivated rye-grass was lighte coloured than most of the wayside or nativ rye-grass plants. This faintness of colour i the cultivated rye-grass is no doubt in par the effects of the cultivated plants being muc shaded by the closeness and rankness of thei growth; and it may also have, in some measure, arisen from lightish coloured plant having been originally chosen for seed Pacey's, or Peacy's, so-called perennial rye grass, the introduction of which was coeva with, or very shortly after, the short-lived o "annual rye-grass" began to be noticed, wa at first remarkable for its redness or depth o colouring; and this, taken in connexion wit the low state of botanical knowledge amon agricultural authors of the time, may hav aided in confirming the opinion that th latter had been derived from the L. album Colour has, however, nothing to do with permanency in the varieties of rye-grass, for som of the darkest are as short-lived as the lightest and redness is by no means a characteristi feature in some of those long-enduring varieties that are now most highly esteemed.

RUBSEN SEEDS.

At the meeting of the promoters of the Seed Adulteration Bill with the President of the Board of Trade, the statement in which Rubsen, or German Rape Seed, is mentioned as being used in large quantities (after undergoing a process of steaming and kiln-drying) for the purpose of mixing with English-grown turnip seed, has led to inquiries from some of the less initiated as to what this Rubsen is.

In reply to those queries, we have to explain that Rubsen is the *Brassica rapa* of Linnæus, commonly called rough-leaved rape, and the supposed origin of the cultivated turnip. This is, in fact, the only kind to whic the name of rape was originally applied, an it was formerly the subject of considerabl cultivation in England. In the celebrate Herbal of Gerarde (1597), it is called Rapu sylvestre, wild turnip, or *rape*, while th smooth-leaved sorts are termed Napes o Navewes. Of this, he adds, that "it hath long broad, and rough leaves, like those of turnips, and beareth the seed whereof is mad rape oil, and feedeth singing birds;" an that "wild turnips, or rapes, do grow of them selves in fallow fields, and likewise by highways near unto old walls, upon ditch-banks, and near unto towns and villages, and in untoiled and rough places." Hooker and Babington, in their *Modern British Flora*, agree in stating its native habitats to be borders of fields and waste places, but it is by no means so common in Britain as the statement would seem to imply. We fear that many of our botanical collectors take for their herbarium specimens, field and wayside plants of the cultivated rough-leaved turnips. This is the more likely, seeing that seeds of these, dropped after ripening in autumn, produce plants which invariably run to flower in the following spring, although their roots may not have attained to more than the size and appearance presented by those of the wild or unimproved Brassica rapa, which is most frequently found near fortifications and other old inhabited places, which, in May and beginning of June, are annually clothed in rich profusion with the co-mingled yellow flowers of Rubsen and wild wall-flower.

Rubsen was long since grown in England; but all knowledge of it seems to have been lost till its seed was re-introduced from Germany, shortly after the first quarter of the present century. Nor has its culture been resumed to any notable extent in Britain, the needful supply of seed being easily procured from the Continent, and that at such low rates as would not remunerate home cultivators for its production.

In the early history of turnip seed adulteration, nothing was available for that purpose but the "killed" seeds of the smooth-leaved rape, supplemented occasionally by those of the field mustard. All these did very well for mixing with th seeds of Swedish turnips, but they were com paratively easily detected among those of th common and rough-leaved turnips; henc the re-discovery of the Rubsen seed wa hailed as of great importance, on account of i exact resemblance to the latter, and its cu tivation became rapidly extended. Man still remember when, prior to the celebrate tariff of Sir Robert Peel, rape seed wa the only one among the so-called round see which legislative wisdom admitted duty fre and this was done for the ostensible purpo of encouraging the home manufacturing of ra oil, while turnip seed, mustard seed, and see of garden brassica, were saddled with proh bitory, or at least heavy duties. In tho days custom-house officers required to pra tice greater discerning or discriminatin powers than those of the present time. An curious reminiscences are still extant of th *fracas* which took place between *Rubs seed* importers and the custom-house autho ties—the former affirming that it was ra seed, while the latter as stoutly maintain that it was not, but must be one or other the prohibited round seeds; nor was a definite understanding come to till some the seized cargoes had been proved by gro ing samples of them; and even then, althou convinced that the plants were neither tho of turnip, mustard, kale, cabbage, nor cau flower, it was by no means easy to satis those servants of the nation that it was real a kind of rape after all, but only a differe kind from that with which they were accu tomed to deal.—*Seedsman.*

THE FLESH AND FATTENING OF STOCK.

FROM a difficulty in obtaining young cattle, particularly shorthorns, by their purchase at fairs and markets, of a desirable quality, and the great trouble attending seeking them from breeders not being feeders at their homes, it would be well for those who may desire to be distinguished as the feeders cattle to breed the whole, or at any ra the greater portion, of the stock they m require for the purpose. Besides the impo ant advantages of the saving of many mont time in the process of fattening, and t superior quality of the fattened animals being the result of the feeding process having been conducted without intermission from the earliest period of their existence, the supply is always obtained at a much less cost by breeding than by the purchase of young stock for being fattened. The enterprising farmer will, therefore, endeavour, under every circumstance of possibility, to combine the breeding, rearing, and feeding of stock as the most profitable, as well as the most successful practice in supplying the public with the animal portion of their food.

The generous treatment of the young animal to promote its growth is quite as necessary to the successful feeding of stock as a nutritious diet in the process of its being fattened. In the early period of an animal's existence the milk of its dam is not only the very best food it can receive, but there is no adequate substitute for it in any other material whatever; and where superior cattle for being fed are intended to be raised, the principal food of the calf should be the whole of their mother's milk for at least six months, and for cattle intended to be exhibited at any of the great national shows for fat stock, the calves should receive the whole of their dam's milk for even twelvemonths, or until the cows be dried of their milk, previous to their next succeeding calving. When cattle of great excellence are required, the milk of the dams of such cannot be applied with advantage to any other purpose simultaneously with the feeding of the calves. Cheese or butter, and the best beef in the shortest period, cannot be produced in the same time. The success of [illegible] objects must be sacrificed to [illegible] both objects a [illegible] [illegible] superio [illegible] the beef of animals that have had so liberal an allowance of milk during the early period of their existence than when reared in the usual way, will more than compensate th value of the large supply of milk to the cal With the price at which beef will for the futur be likely to keep, the production of young stoc of a superior quality for being fattened wi certainly prove to be a more profitable appl cation of milk than any other, except it be i sale in large towns.

When calves are weaned, they shoul have some food of a highly nutritiou character in place of the milk withdraw The food in question should be calculated t promote the growth of the frame, and that c the *lyer* or muscle, but not of fat. A usef formula for food in the place of milk to b withdrawn from the weaned calf will b found in a mixture of—Bean or pea meal, lb.; crushed linseed oilcake, 1 lb.; bon ashes in powder, 4 oz.; common salt, 2 oz. powdered ginger, ¼ oz. This should b given, divided into two feeds a-day, in tw quarts, with each feed of wheat bran in milk-warm mash. After a calf has complete its first year, the meal and crushed cake i the above stated mixture will be required t be increased, perhaps doubled. A chang of food, in all cases, and with all animal should take place gradually, and whilst a cal receives a considerable portion of its allowanc of milk, one feed of the mixture may only b given in place of two a-day; the best pas ture in summer, and hay from seedling gras in winter, should continue to be given wit the aforesaid mixture until the animal has a least completed the second year of its age when, if a shorthorn, the after purpose o breeding from or being fattened should b determined upon. Any other breed than th shorthorn may, perhaps, require a few mor [illegible] growth before being fattened, or th [illegible] to the bull; but liberal treatmen [illegible] will induce such precocity i [illegible] breed, for the fattening process t [illegible] commenced successfully at between tw [illegible] three years old.

The object of adding bones to the mea and oilcake in the feeding mixture is to promote the growth of the skeleton or frame o the animal; and the *rationale* of the use o such an ingredient is, that a portion of th bone being dissolved by the gastric juice of the stomach becomes a soluble phosphate of lime, in which state it is received into the circulation, and becomes a constituent of the blood, and by it is assimilated to the frame of the animal. The quantity of bone prescribed may appear to be, and certainly is, much greater than can be assimilated to the substance of the animal, but any redundance, after passing through the stomachs and intestines of the young cattle, will render their fæces valuable as manure, which is not the case under ordinary circumstances, from the absence of phosphoric acid in the excreta of young growing animals.

By the treatment recommended in the foregoing remarks, a young beast, when it has completed the second year of its age, will be a well-grown and well-formed animal; its carcase weight will be at least 60 stones of lean flesh; and it will be in a condition of rapidly becoming fat, when its beef will be of the finest possible quality.

Previous to the early part of the present century turnips were but little grown as a field crop, and the feeding of cattle during winter was very rarely practised, the only supply of beef in winter being the salted flesh of cattle grazed during summer, and slaughtered towards the end of autumn. At a later period, cattle were winter fed on turnips and straw, which. less than forty years since, was almost universally the sole food of wintered fattened beasts; but which practice has now given place to fattening cattle at a much earlier age than formerly, with the assistance of the meal of different varieties of cereal and leguminous corn, both of home and foreign production, linseed oil cake, and other extraneous feeding stuffs, in addition to turnips and other roots and straw. In the modern, and what is considered to be the improved mode of feeding cattle, the food used for the purpose undergoes preparation, in the roots being sliced or grated, and the straw, cut into lengths of about half an inch, is softened by the application of steam, and with which is mixed meal and crushed linseed oil cake or other extraneous or concentrated food, to which spices as a condiment is very f quently added, with a view to stimulate t appetite and promote digestion.

Of the articles called "factitious" or " traneous" feeding-stuffs for fattening catt the following are those most commonly in u viz.:—The rough meal of barley, either home or foreign production. The rou meal of maize or Indian corn, the most which is imported from the United States America, and to a small extent from t ports of the Mediterranean and Black Se The rough meal of beans, either of home foreign production. The rough meal of pe either of home or foreign production.

Carob, or locust pods, is the fruit of t Ceratonia siligua carob, sometimes call Saint John's bread. The article in questi is the fruit of a large tree allied to t Acacias, frequently forming vast forests, a found throughout the greater part of southe Europe, Asia, and Africa; in fact, in all pa of the world where the climate is warm than that of this country. Of the t varieties at present commonly met with commerce, the Syrian and Sicilian, the f mer is preferred to the latter-mentioned, it appears to contain a greater amount sugar and gum. Locust pods contain t fat-forming elements as cattle food in a ve great degree, but when they are used, t very hard and indigestible seeds which th contain, and which forms 11 or 12 per cen of their weight, should, if possible, be sep ated from them, as they have been known be the cause of fatal disease from lodging the stomachs of cattle.

Linseed oil cake is imported from t United States of America, and from the Co tinent of Europe, but the greatest porti used in this country is the produce of the o mills at home, and the principal seat of t manufacture of seed, oils, and oil cake in th country is Hull. This valuable article of catt food is frequently adulterated with infer and unwholesome, and sometimes deleterio matters; and the only prevention against su impositions is only to deal with people of t highest character for integrity, and to pu chase none but that which is represented be of the very best quality. Cotton seed oil cake is imported from the United States of America and the East Indies. Rapeseed oil cake is to be obtained from the seed crushers. The two last-mentioned kinds of oil cake are much lower in price, but at the same time inferior in the feeding qualities to linseed oil cake. Linseed oil may be used for feeding cattle in quantity of a gallon per week, mixed with cut straw, for each animal. Molasses, or uncrystalized juice of the sugar cane, is imported from the West Indies, the Brazils, and other parts of the world in which sugar is grown. The syrup produced in the sugar refineries in London and Glasgow is a similar article. Sugar foots is an imperfectly granulated or crystalized sugar, which may sometimes be obtained at somewhat less than the price of perfect sugar, and may be used with great effect in promoting the fattening of cattle.

The constituents, and the quality of the beef of fat cattle, and an enumeration of the several articles that are commonly used as extraneous or concentrated food in their fattening, having been topics noticed in the foregoing remarks, a description of an effective mode of proceeding in the fattening process yet remains to be given in the present article. With this object, the subject for description will be supposed to be a two-year-old steer, of the shorthorn breed, and supposed to have been bred and reared on the farm, and its growth to have been promoted to the greatest extent by the liberal treatment referred to. A well-selected and well-bred shorthorn steer, having completed the second yea [illegible] his age, under the circumstances referre [illegible] may be suppose [illegible] o have attained [illegible] quite h [illegible] be sun [illegible] ull [illegible] case [illegible] stones of lea beef at the [illegible] ement of his being fattened which may be supposed to occur either at the latter part of May, or towards the end of October, according as the animal may have been calved, and have completed the second year of his age, in spring or the following autumn.

Should the fattening process be commenced in May, vetches will be the best article for the staple food of the animal during a portion of May, the whole of June and July, and during a portion of August; and the stage of the fodder plant in question should be when the pod is just formed, and the supply should be *ad libitum.* Some grey topped stone turnips should be in readiness by August, gradually to take the place of the vetches, until green topped globe turnips are ready at the commencement o October, which should then be the staple food until the middle of November, wher yellow hybrid turnips or swedes should supersede the green tops. Two or three feeds o meal and oil cake per day should be given ir steamed chaff, in addition to the vetches anc roots forming the staple food of the stee being fattened during summer and autumn.

With an *ad libitum* supply of straw, th quantity of common turnips which a larg sized shorthorn steer, when fed entirely upo turnips and straw, will consume in twenty-fou hours, is about 10 stones, of which 7¼ stone of swedes will be equivalent; and a goo beast in vigorous health and good conditio may be expected to gain about a stone in hi weight for every 80 stones of common tu nips, or 58 stones of swedes he consumes whil the roots continue sound and in good condi tion. Instead, however, of feeding fattenin cattle entirely upon roots and straw, whic was formerly the usual practice, the meal c ereal and leguminous corn, and other cor [illegible] is now very generally subst [illegible] portion of roots. In this it i [illegible] ally considered, that 4 lb. of bear [illegible] 2 lb. of crushed linseed oil cak [illegible] an equal amount of nutrimer [illegible] 4 stones of common turnips [illegible] it is found that a moderate quantity c meal and cake, in place of a moderat portion of the quantity of turnips which beast will consume, will produce a muc

quality of beef than can be obtained
ie use of turnips alone. As a con-
ated food to be used in place of a por-
of turnips in the fattening of cattle either
e two following mixtures, in which should
qual weights of the several ingredients,
e found to be very effective, viz. :—

or pea-meal; barley, or Indian corn
; crushed linseed oil cake, or the three
e-mentioned ingredients with the ad-
n of locust pods.

ee lb. with an ounce and a half of common
and a quarter of an ounce of the best
d ginger, given with a peck of chaff or
raw, softened by the application of steam,
be a feed in place of 2 stones of sliced
ps. In the early period of the process of
ing commenced in May, vetches may
ven thrice and the mixture twice a-day;
vhen turnips become the staple food in
utumn, the feeding should be reversed
e turnips being supplied twice, and the
ire thrice in the day. This treatment
nued till the middle of December, the
ing process will have been in operation
g a period of about thirty weeks, in
n time an increase of at least 25 stones
e weight of the animal will have taken
, or a carcase weight of about 85 stones
be attained at two years and seven
hs of age.

ie staple food of the steer, the fattening
hich is commenced in October, will be
non or hybrid turnips, until the com-
ement of the ensuing January, when
es will take their place during the spring,
ng as that root continues unconsumed
tock, which, perhaps, will be until the
of April. Until the end of December
llowance of the feeding mixture should
vo feeds a-day with three feeds of turnips;
which the feeding may be reversed by
g three feeds of the mixture and two of
; and unless clover and tares be ready,
der to economize the roots, four feeds of
ned chaff and feeding mixture, and only
of roots, may be given. After the end of
l, when swedes will be greatly deteriorated
eir feeding properties, and until the ap-
h of Whitsuntide, when the fat cattle
become scarce and realise a higher price than at any other season except Christmas, the cattle being fattened will require an extra quantity of feeding mixture to maintain them in full condition until the end of May or beginning of June, at which time the steer, of which the feeding has been commenced in October, will have gained the same increase of weight as that of which the fattening has been commenced in May and continued till December.

Should the animal, in either of the two supposed cases adduced, prove, when about two years and a-half old, to be of extraordinary excellence, and shew a capability of commensurate increase of weight, its owner may be, perhaps, induced to continue the fattening process until the second Christmas, and to enter it for exhibition at a show for fat stock; in which case, during the latter period of fattening, the feeds of concentrated food should be increased to 4 lb. each, when the bean or pea-meal should be withdrawn from the mixture, and barley or Indian corn increased to double the quantity. If the course now spoken of be pursued, the animal in one case will have been eighty-three weeks under process of being fattened, and the other sixty weeks, when in one case the animal will probably have attained the carcase weight of 130 imperial stones at three years and seven months old, and in the other of 110 stones at three years and eight weeks of age; and should not the owner, in either case, succeed in obtaining a prize, he will, at all events, be certain to obtain an extra price by the stone for the animals.

Whilst fattening cattle are being fed on turnips, each animal should have 4 lb. of fodder given to it in racks at night. An excellent fodder for the purpose in question, is composed of one-half to two-thirds of clover hay, and one-third to one-half of newly-threshed straw. The mixture will be best made when being stacked with the clover not quite dried, and the mixture plentifully sprinkled with salt as the stack is made. By the mode of preparing the fodder for cattle pointed out, the clover will be made to go much further than when used alone, and being

[illegible]

[illegible] to end in disappointment and perhaps [illegible] and serious loss as an enterprise.

A matter having considerable influence in the success of the fattening of cattle is the mode in which the animals are sheltere and lodged during the process, and in thi when properly effected, certain conditio require to be fulfilled. In order for cattle thrive best during the process of their bei fattened, their lairs should possess the mea of promoting the quietude and comfort the animals to the greatest extent. Cattl being gregarious, delight in the companio ship of their kind, and one of the most e sential conditions to be fulfilled in the co struction of their lairs is to provide f company, as with solitary confineme they will not make satisfactory progre towards becoming fat. Another essential a good lair for cattle is the co-existence complete shelter with perfect ventilatio And a third condition is, that places in whic cattle are confined should be so arrang that the animals may have every requisite a tendance with the least expense of labou and that the cost of construction of the lai should be moderate. Without a combinatio of the whole of the properties pointed ou the lodging places for cattle cannot be co sidered to be complete; and the next subje to be considered is to inquire how far th conditions in question are fulfilled in th several modes of lodging cattle usually adopte in farmsteads.

The most simple mode of housing catt is by the foldyard and shed. This, where s placed as to be sheltered from the prevaili winds, and a sufficient area allowed for eac beast the accommodation is intended to co tain, is all that can be desired for you growing beasts, and it may also be adopte for cattle being fattened, if the number beasts to be confined in each fold and sh be restricted to four. The area which shou be allowed to each animal should not less than 225 square feet, of which one-thi should be under roof, and to which the catt may retire at pleasure. A proper length this accommodation is 5 feet for each anim it is intended to contain, by which the sh or covered portion will occupy a breadth 15 feet, and the open portion or foldyard, front of the shed, will occupy a breadth 30 feet.

Of late years, the fold and shed have in many instances been improved upon, by the whole area, instead of only a portion, being under cover. When the entirely covered yard is adopted, the minimum area that should be allowed for each head of cattle it is intended to contain should be 150 square feet; and in case the yards are large, they should be divided into compartments to accommodate five or six, or, at most, half-a-score, in each. The accommodation in question will require the most perfect ventilation to be provided; and when such is the case it may be adopted with the best effect either for growing or fattening stock.

Another mode of lodging cattle is in feeding boxes, which consist of compartments of a shed to contain a single animal in each. The usual size of each of such compartments is 9 feet square in the clear, and when properly constructed, the floor of each is sunk 2 feet below the level of the external ground, and, by being enclosed by brickwork set in cement 1 foot above the ground-level, the pits of the boxes will have each a space to contain 9 cubic yards, and made perfectly water-tight. The lairs under notice are alone adapted for cattle being fattened, and unless the animals are allowed daily exercise whilst kept in boxes, such a mode of lodging cattle for the purpose is not free from an important objection. The objection alluded to is, from the absence of counter pressure in constantly standing on a mass of soft litter, the muscles of the limbs of the animals become relaxed, thereby rendering them unable to travel beyond a short distance on a good road without serious injury from excessive fatigue. For a secondary object in keeping cattle—that of making manure—no other mode of lodging the animal can be compared to the use of boxes for the production of much of such excellence of quality. With a passage 10 feet in breadth between two rows of boxes, the area occupied by the lair for each beast will be 135 square feet. The mode of lodging cattle in question is unquestionably inferior to that last noticed, and not to be recommended for adoption, except in localities within a short distance of a market for fat cattle, or of a station from whence they may be conveyed by railway to a market. It should not be forgotten, however, that cattle, when kept in boxes, enjoy a very great degree of quietude, companionship of their congeners, and freedom from molestation by each other, all which are conditions most favourable to rapid thriving in the process of being fattened.

The only mode of lodging cattle yet remaining to be noticed is that in which the animals are tied up in the stalls of the beast-house, or byre. The mode in question may seem, at first sight, in considering the subject, to have several objections incidental to its adoption; but means may be taken by which, if such faults may not entirely be removed, they may, at any rate, be greatly mitigated. Thus the labour incident to the removal of the excrements of the animals sheltered in byres, if it cannot be entirely obviated, may be reduced to a minimum amount by suitable tram or other ways, and well-constructed waggons, by which the excrements may be removed with the least expenditure of labour; and the ill effects of the rigidity of the confinement incidental to the system may be counteracted by the animals being turned loose for an hour or two each day, when the weather may permit, for gentle exercise. Whatever may be thought to the contrary, the fact of its being the mode generally adopted in the north-east of Scotland, where the fattening of cattle is practised with greater success than in any other district in the United Kingdom, plainly shews the sheltering of cattle by tying them up in byres to be practically a good one; and the turning loose fattening cattle for exercise when confined in byres, which is also practised in the same part of Scotland, is far from deserving condemnation on account of unnecessary supply of food being required to compensate the waste of the substance of the fattening animals occasioned by the exercise. In fact, the gentle exercise referred to is necessary not only to train a fattened animal to endure without injury the exertions to which it is exposed when sent to competitive exhibitions of fat stock, but also to promote the digestive powers of the animal, by which its stacked with a portion of straw before being thoroughly dry, the sap of the clover will impart a relish and feeding property to the straw, which will render the mixture little inferior in nutriment to entire hay. When the molasses or coarse sugar is used in the feeding of cattle, it should be used in the place of, and in equal weight, as locust pods; and either article should be dissolved in hot water in the proportion of 1 lb. of the former to 2 quarts of the latter, and mixed with the steamed chaff previous to the meal and oil cake being mixed with it. The several ingredients of the concentrated food of cattle are considerably increased in bulk by being crushed or ground, and which increase is as follows, viz. :—

	Whole. lb.	Crushed. lb.
1 bushel of linseed weighs	51	32
,, ,, barley ,,	54	36
1 ,, ,, peas ,,	67	49
1 ,, ,, oil cake ,,	—	45

Of steers and heifers of the same breed, heifers do not attain the same carcase weight as steers; but, being more precocious, heifers are equally advanced in their growth for being fattened with advantage at several months earlier age than steers; and, moreover, from a greater proneness to fatten, the increase of flesh is equal, and sometimes even greater, from a less quantity of food consumed by a heifer than it is by a steer; heifers are, therefore, with much reason, very frequently preferred to steers as stock for being fattened. Whatever may be the sex of animals that may be selected for being fattened, they should always be well grown, with their frames carrying a full substance of lean flesh; for unless cattle have had a plentiful su[illegible] [illegible] e grow h [illegible] [illegible] husbandry [illegible] ointment and [illegible]

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d for adoption, except in localities
a short distance of a market for fat
cattle, or of a station from whence they may be conveyed by railway to a market. It should not be forgotten, however, that cattle, when kept in boxes, enjoy a very great degree of quietude, companionship of their congeners, and freedom from molestation by each other, all which are conditions most favourable to rapid thriving in the process of being fattened.

The only mode of lodging cattle yet remaining to be noticed is that in which the animals are tied up in the stalls of the beast-house, or byre. The mode in question may seem, at first sight, in considering the subject, to have several objections incidental to its adoption; but means may be taken by which, if such faults may not entirely be removed, they may, at any rate, be greatly mitigated. Thus the labour incident to the removal of the excrements of the animals sheltered in byres, if it cannot be entirely obviated, may be reduced to a minimum amount by suitable tram or other ways, and well-constructed waggons, by which the excrements may be removed with the least expenditure of labour; and the ill effects of the rigidity of the confinement incidental to the system may be counteracted by the animals being turned loose for an hour or two each day, when the weather may permit, for gentle exercise. Whatever may be thought to the contrary, the fact of its being the mode generally adopted in the north-east of Scotland, where the fattening of cattle is practised with greater success than in any other district in the United Kingdom, plainly shews the sheltering of cattle by tying them up in byres to be practically a good one; and the turning loose fattening cattle for exercise when confined in byres, which is also practised in the same part of Scotland, is far from deserving condemnation on account of unnecessary supply of food being required to compensate the waste of the substance of the fattening animals occasioned by the exercise. In fact, the gentle exercise referred to is necessary not only to train a fattened animal to endure without injury the exertions to which it is exposed when sent to competitive exhibitions of fat stock, but also to promote the digestive powers of the animal, by which its food may be assimilated in the greatest possible degree to its substance. The least area that will be required to be occupied by each animal in the mode of shelter now being noticed, is 60 square feet; which, it will be perceived, is much less than the area required by any of the other modes that have been previously noticed. It may also be remarked, that the mode of shelter by tying up in byres is the only one that can be conveniently adopted for cows that have to be milked.

The sheltering and lodging of cattle are certainly most important matters for consideration, as well during the period of their growth as during the process of their being fattened. From the foregoing notices of the different modes in use for that object, it may probably be understood that each mode, when judiciously applied, may have some particular merit to recommend it, though, perhaps, under different circumstances, for adoption; and, therefore, he who may desire to have the best appliances for the purposes referred to, should pause before condemning and rejecting any of such modes as utterly useless or detrimental in practice.

CONTAGIOUS AND INFECTIOUS DISEASES AMONG ANIMALS.

NEW ORDERS IN COUNCIL.

(*From the London Gazette of Tuesday, August* 10).

THE first Order simply revokes all previous Orders dating from November 22, 1866, to May 6, 1869. The second is as follows:—

At the Council Chamber, Whitehall, the 10th day of August 1869, by the Lords of Her Majesty's Most Honourable Privy Council. Present—Lord President, Lord Privy Seal, Lord Northbrook, Mr Secretary Bruce, and Mr Forster.

Whereas by reason of the passing of the Contagious Diseases (Animals) Act, 1869 (in this order referred to as the Act of 1869), and of the making of an Order of Council bearing even date herewith, whereby all former orders in force relative to contagious and infectious diseases among animals in Great Britain are revoked, it has become expedient to renew such of the provisions of former Orders as are intended to remain in operation, and to make some further provisions for better preventing the introduction or spreading of contagious or infectious diseases among animals in Great Britain.

Now, therefore, the lords and others of her Majesty's most Honourable Privy Council, by virtue and in exercise of the powers in them vested under the Act of 1869, and of every other power enabling them in this behalf to order, and it is hereby ordered as follows:—

PRELIMINARY.

1. This order may be cited as "The Contagious Diseases (Animals) Order of August 1869."

2. This order extends to Great Britain only.

3. In this order the term "master" includes any person having the charge or command of a vessel; other terms have the same meaning as in the Act of 1869.

FOREIGN ANIMALS.

4. Foreign animals shall not be landed except at such places, in such manner, within such times, and subject to such supervision and control, as the commissioners of her Majesty's customs from time to time direct.

5. Subject to any Order of Council to the contrary (either of even date herewith or hereafter made), all the regulations of the 4th schedule to the Act of 1869 shall apply to cattle brought from any port of any of the countries comprised in the schedule to this order, and subject as aforesaid, all such cattle shall be slaughtered within ten days after the landing thereof, exclusive of the day of landing.

6. The landing of foreign cattle elsewhere than at a part of a port defined by order of council at a landing place for slaughter, shall be subject to the following conditions:—

First,—That the vessel in which they are imported has not, within three months before taking them on board, had on board any cattle exported from any port of any of the countries comprised in the schedule to this order.

Secondly,—That the vessel has not, since taking on board the cattle imported, entered any ports of any of those countries.

Thirdly,—That the cattle imported have not, while on board the vessel, been in contact with any cattle exported from any port of any of those countries.

And foreign cattle shall not be landed elsewhere than at a landing place for slaughter, unless and until—

(1.) The owner or charterer of the vessel in which they are imported, or his agent in Great Britain, has entered into a bond to her Majesty the Queen, in a sum not exceeding £1000, with or without a surety or sureties, to the satisfaction of the Commissioners of her Majesty's Customs, conditioned for the observance of the foregoing conditions in relation to cattle to be landed under this order from the vessel; and

(2.) The master of the vessel has, on each occasion of importation of cattle therein, satisfied the Commissioners of Her Majesty's Customs or their proper officer, by declaration made and signed or otherwise, that none of the cattle then imported therein have been exported from any port of any of the countries comprised in the schedule to this order, and that the foregoing conditions have been observed in relation to all the cattle then imported therein.

7. Foreign animals landed from a vessel elsewhere han at a landing place for slaughter shall not be moved therefrom, or be allowed to come in contact with any other animals, until they have been examined by the veterinary inspectors appointed in this behalf by the Commissioners of her Majesty's Customs; and according to the result of such inspection the following consequences shall ensue :—

(1.) If the inspector certifies that all the animals landed from the vessel are free from contagious or infectious disease, they shall thereupon cease to be deemed foreign animals.

(2.) If the inspector certifies, with respect to any one or more of the animals landed from the vessel, that it or they is or are affected with any contagious or infectious disease, all the animals then imported in the vessel shall be dealt with in such manner as the Commissioners of her Majesty's Customs direct.

8. If a vessel arriving at a port has on board the carcase of a foreign animal (including a horse) which was taken on board for the purpose of importation, but has died on the voyage, the master of the vessel shall, immediately on arrival, report the fact to the principal officer of her Majesty's Customs at the port.

No such carcase shall be landed or discharged from the vessel without the permission in writing of the principal officer.

The master, if the principal officer so requires, shall proceed to sea, and shall throw every such carcase overboard into the sea at such place, or at such distance from shore, at such state of the tide, and within such time, as the principal officer directs.

9. Where it appears to the principal officer of her Majesty's Customs at a port, with respect to any foreign animal (including a horse), or any hay, straw, fodder, or other article, brought by sea to the port, that contagion or infection may be thereby convej
to animals, he may seize and detain the same, and
shall forthwith report the facts to the Commission
of her Majesty's Customs, who may give such dir
tions as they think fit, either for the slaughter or
struction or the further detention thereof, or for
restoration thereof to the owner on such conditions
any (including payment by the owner of expenses
curred by them in respect of detention thereof),
they think fit.

DISCOVERY AND PREVENTION OF DISEASE.

10. Every person having in his possession or un
his charge an animal (including a horse) affected w
a contagious or infectious disease, shall observe t
following rules :—

(1.) He shall, as far as practicable, keep such a
mal separate from animals not so affected.

(2.) He shall, with all practicable speed, gi
notice to a police constable of the fact of the a
mal being so affected.

Such police constable shall forthwith give not
thereof to the inspector of the local authority, w
shall forthwith report the same to the local author
and to the Privy Council.

11. Where an inspector finds any contagious or i
fectious disease to exist in his district, he shall fort
with make a return to the local authority and to t
Privy Council of the number and description of
animals being on the farm or in the shed or other pla
where the disease is found, which he considers lial
to be affected with the disease, distinguishing th
that are healthy from those that are actually affect
with the disease, and shall continue to make a simil
return on the Saturday of every week until the disea
has disappeared.

12. Where under section 60 of the Act of 1869, a ho
or animal is buried, its skin shall be first so slash
as to prevent its being of any use. The local authori
may, if they think fit, use for the purpose of su
burial any place on the premises of the owner of t
horse or animal.

13. Where a local authority is authorised by licen
from the Privy Council to destroy, under section 60
the Act of 1869, horses or animals that have died
been slaughtered as therein mentioned, every su
horse or animal shall be destroyed in mann
following, namely :—The carcase thereof shall be d
infected, and shall then be removed in charge of
officer of the local authority to a horse slaughterer's
knacker's yard licensed for the purpose by the Pri
Council, or other place so licensed, and shall be the
destroyed by exposure to a high temperature or
chemical agents. In every such case the lo
authority shall report to the Privy Council the fa
and mode of destruction.

14. Where a local authority exercise the power
causing premises to be cleansed and disinfected co
ferred on them by section 61 of the Act of 1869, tl

occupier of those premises shall give all facilities for that purpose.

15. A local authority may, from time to time, with the view of preventing the spreading of contagious or infectious disease, make regulations for the following purposes, or any of them:—

For prohibiting or regulating the movement of animals (including horses), on to, from, and through, and the keeping thereof on commons and wastes and commonable and other lands whereon there exists a right of common or other right in the nature thereof.

For preventing any person from driving animals (including horses) under his charge, or allowing them to be driven or to stray, into an enclosed field or place without the consent of the occupier thereof.

For preventing the propagation of any such disease by means of dogs, and for causing for that purpose stray dogs to be destroyed or otherwise disposed of.

16. Any officer authorised in this behalf by a local authority, or any constable or police officer, may stop and detain any animal (including a horse) which is being moved, or which he has reasonable grounds for suspecting is being moved, in contravention of the Act of 1869, or this or any other Order of Council, and may apprehend, without warrant, the person in charge thereof, and bring him before a justice, who shall inquire into the case in a summary manner, and may, if satisfied that there are good grounds for so suspecting, by writing under his hand, direct the animal to be detained, and the person in charge thereof to be brought before two justices as soon as practicable.

On such person being brought before two justices they shall adjudicate on the case in a summary manner, and if satisfied that the animal was being moved in contravention as aforesaid, may direct it to be disposed of in conformity with the provisions of the Act of 1869, and this or any other Order of Council.

17. Any officer authorised in this behalf by a local authority, or any constable or police officer, may inspect any railway truck, cart, boat, or other vehicle used by land or by water, in which animals (including horses), hay, manure, litter, straw, and other articles used for or about animals are usually or at the time of such inspection carried, and may examine the person in charge thereof, with a view to ascertain whether any animals or articles are being moved or carried in contravention of the Act of 1869, or this or any other Order of Council; and such officer may, if he have reasonable grounds for suspecting that such animals or articles are being moved or carried in contravention as aforesaid, apprehend, without warrant, the person in charge thereof, and bring him before a justice, who shall inquire into the case in a summary manner, and may, if satisfied that there are good grounds for so suspecting, by writing under his hand, direct the same to be detained, and the person in charge thereof to be brought before two justices as soon as practicable.

On such person being brought before two justices they shall adjudicate on the case in a summary manner, and if satisfied that the animals or articles were being moved or carried in contravention as aforesaid may direct the same to be destroyed or otherwise disposed of in conformity with the provisions of the Act of 1869, and this or any other Order of Council.

18. Any person having charge of any animal (including a horse), or thing that is being moved on the highway, railway, canal, navigation, or river, for the moving whereof a licence is requisite, shall on being so required by an officer of a local authority authorised in this behalf or by a constable or police officer, produce the licence (if any) for the moving of that animal or thing.

19. A constable, or police or other officer, detaining any animal (including a horse) under the Act of 1869, or this or any other Order of Council, shall cause it to be supplied with requisite food and water during its detention; and any expenses incurred by him in respect thereof may be recovered in a summary manner from the person in charge of the animal or from its owner.

20. Any inspector or other officer empowered to carry the Act of 1869, or this or any other Order of Council into effect, may, if authorised in this behalf by general or special order in writing of the local authority, enter, for the purpose of carrying into effect the provisions of such act or order, any field, stable, cowshed, or other premises within his district, where he has reasonable grounds for supposing that any animal affected with cattle plague or sheep-pox has been, or has been buried or otherwise disposed of.

If any person refuses admission to, or obstructs or impedes, or aids in obstructing or impeding such inspector or other officer, he shall be deemed guilty of an offence against this order.

CLEANSING AND DISINFECTING OF PENS, TRUCKS, ETC

21. Every pen, carriage, truck, horse-box, vehicle or boat used for the carrying of animals on land, or o a canal or inland navigation, shall be cleansed an disinfected once in every twenty-four hours durin the time when it is used for any animal in manne following:—

By sweeping out and effectually removing all dung sawdust, litter, or other matter, from the pen, carriage truck, horse-box, vehicle, or boat, and then b thoroughly washing the same with water, and then b applying to the floor and to all parts above the floo of the pen, carriage, or truck, and to the sides, floo and ceiling of the hold of the boat, and to every othe part of the boat with which animals or their dropping come in contact, a coating of limewash, made up b mixing good freshly-burnt lime with water, and co taining in each gallon of limewash either one-fifth a pint of carbolic acid or one-fifth of a pint of cresyli

l, or four ounces of fresh dry chloride of lime,
ı limewash to be prepared immediately before

he sweepings shall be well mixed with quick-lime,
effectually removed from contact with animals.

GENERAL PROVISIONS.

2. If any person fails to give, produce, do, or ob-
ve any notice, licence, thing, or rule, which he is
this order or any regulation of a local authority
reunder required to give, produce, do, or observe,
shall in every such case be deemed guilty of an
nce against this order.

23. Every local authority shall send to the Privy
uncil a copy of every order or regulation made by
m under the Act of 1869, or this or any Order in
uncil.

24. Every local authority shall forthwith, after the
king of this order, report to the Privy Council the
mes and addresses of their inspectors, under section
of the Act of 1869, and the districts, or parts of dis-
cts, for which such inspectors are appointed to act,
d shall from time to time forthwith report to the Privy
uncil any changes therein.

25. A local authority shall provide and supply,
thout charge, printed copies of documents or forms
quisite under this or any other Order of Council.

26. Every regulation made by a local authority
der this or any other Order of Council shall (where
other provision is made for the publication thereof)
published by advertisement in a newspaper circulat-
g in the district of the local authority.

27. In proceedings before justices or other legal pro-
edings under this or any other Order of Council, a
cal authority may appear by their clerk, or by any
ent authorised by them in writing under the hands
two or more of their members, and a railway com-
ny or any other body corporate may appear in
anner provided by section 107 of the Act of 1869.

ARTHUR HELPS.

SCHEDULE.

1. The dominions of the Emperor of Russia.
2. The Austrian-Hungarian Empire.
3. The States of the North German Confederation.
4. The dominions of the Sultan.
5. The dominions of the King of Italy.
6. The Papal States.
7. Belgium.
8. The Netherlands.
9. The dominions of the King of the Hellenes.

RDER OF COUNCIL FOR METROPOLIS RELATIVE TO CONTAGIOUS AND INFECTIOUS DISEASES AMONG ANIMALS.

At the Council Chamber, Whitehall, the 10th day
f August, 1869.

By the Lords of her Majesty's Most Honourable
Privy Council.

Whereas by reason of the passing of the Contagious
iseases (Animals) Act, 1869 (in this Order referred to as the Act of 1869), and of the making of an Order of Council, bearing even date herewith, whereby all former orders in force relative to contagious and infectious diseases among animals are revoked, and of another Order of Council also bearing even date herewith relating to contagious and infectious diseases among animals in Great Britain, it has become expedient to renew such of the provisions of former orders relating to the metropolis as are intended to remain in operation, and to make some further provisions for better preventing the introduction or spreading of contagious or infectious diseases amongst animals in or through the metropolis.

Now, therefore, the Lords and others of her Majesty's most Honourable Privy Council, by virtue and in exercise of the powers in them vested under the Act of 1869, and of every other power enabling them on this behalf, do order, and it is hereby ordered, as follows:—

PRELIMINARY.

1. This Order may be cited as the Metropolitan Contagious Diseases (Animals) Order of August, 1869.

2. This Order relates to the Metropolis only; and the provisions thereof are supplemental to and not in substitution for those of the Contagious Diseases (Animals) Order of August, 1869.

3. In this Order words have the same meaning as in the Act of 1869.

FOREIGN CATTLE.

4. With respect to foreign cattle landed in the port of London, the following regulations shall have effect, in addition to those contained in the Contagious Diseases (Animals) Order of August 1869.

1. If the place of landing is a landing-place for slaughter defined, as in that order mentioned, and is not within the metropolis, the cattle shall, unless slaughtered at the place of landing, be removed thence by railway to the metropolis, and not otherwise or elsewhere.
2. They shall be brought along the railway in trucks appropriated for foreign cattle, and having a red stripe two feet wide all round to distinguish them as so appropriated, which trucks shall, after each occasion of use, be cleansed and disinfected in manner provided by article 21 of that order.

5. Foreign cattle brought within the metropolis shall be forthwith taken, either to lairs licensed in that behalf by the Privy Council, or to the Metropolitan Cattle Market, and in either case shall be slaughtered within ten days after landing, exclusive of the day of landing, and, until taken to be slaughtered, shall be kept in the lairs licensed in that behalf by the Privy Council.

MOVEMENT OF CATTLE.

6. Cattle shall not be moved along a highway, thoroughfare, or public place within the metropolis, or be moved out of the metropolis, except in the cases

described in and in conformity with the provisions of this order.

7. Cattle may be moved along a highway, thoroughfare, or public place within the metropolis with a licence of the Commissioners of Police.

8. When cattle are brought to the Metropolitan Cattle Market, the person bringing them shall deliver the licence under which they have been moved to the officer of the market appointed to receive it, and it shall be retained, numbered, and carefully preserved by such officer.

9. Cattle sold or exposed for sale in the Metropolitan Cattle Market shall not be moved therefrom except with a market pass (in the form set forth in the first schedule to this order, or to the like effect) to be given to the purchaser or owner desiring to move the same by an officer of the market appointed for the purpose.

10. Cattle may (without a licence) be moved along a highway, thoroughfare, or public thoroughfare within the metropolis, from part to part of the same farm, or to water, for a distance, in either case not exceeding five hundred yards.

11. Cattle brought into the metropolis by the following railways—namely, Great Northern, Great Western, London and North-Western, London and South-Western, Midland, may be moved within and out of the metropolis by the respective routes described in the second schedule to this order under the names of those railways respectively, on the following conditions :—

1. That cattle so moved shall not, while within the metropolis, be taken out of the waggon in which they are brought into the metropolis.
2. That if any cattle so moved accidentally or otherwise, while within the metropolis, leave or are taken out of the waggon in which they are so moved, they shall not be placed again in the same or any other waggon on any railway within the metropolis, and shall not be moved out of the metropolis.

12. Where a person occupies a farm situate partly within and partly without the metropolis, or any other contiguous premises so situate, he may, with a licence of the Commissioner of Police of the metropolis, move from one part of such premises to another cattle which have been in his possession for twenty-eight days or upwards before the date of the licence, and have been marked in such manner as the Commissioner of Police directs.

[illegible] metropolis [illegible] twenty-eight [illegible] out of the metropolis [illegible] notice of such his desire to the local authority, by writing, stating the follow things : -

1. The fact of the requisite possession as aforesai
2. The name and residence of the owner of animal.
3. The name of the person to whom, and the pl to which the animal is to be sent.
4. A description of the animal, stating its s breed, age, distinctive marks, and other parti lars sufficient for identification.

14. On receipt of any such notice, the local a thority shall, unless there appears to them good reas to the contrary, and on being satisfied of the fact possession for the requisite time, proceed, as soon may be, to cause their inspector to visit the cow-sh or place from which the animal is desired to be move at the times following :—

1. In all cases, within three days after the recei by the local authority of the owner's notice; a again
2. In the case of an animal other than such a c as aforesaid, at the expiration of twenty-eig days from the day of the first visit (both days i clusive) : but,
3. In the case of such a calf as aforesaid, at the e piration of seven days from the day of the fi visit (both days inclusive) :

and to report to the local authority on the state health of the cattle in the cow-shed or place aforesai

15. If in the case of any animal, the inspector, o each such visit, is satisfied and reports that it and a other cattle in the cow-shed or place aforesaid a free from contagious or infectious disease, and th such animal has not, since the inspector's first visit, bee in contact with any cattle other than those in the cow shed or place aforesaid, the local authority shall infor the owner thereof, and shall communicate the owner notice and inspector's reports to the Commissioner Police of the metropolis, and if the cow-shed o place is within the city of London or the liberti thereof, then also to the Commissioner of Police the city.

Thereupon the animal may be moved out of th metropolis at such time within three days after th second visit of the inspector, and by such route, as i each case the Commissioner of Police of the metropol prescribes, on the identity of the animal to which th notice and reports relate being shewn to the satisfa [illegible] that Commissioner of Police, or of an offic [illegible] politan force appointed by him for th

Nothing in the foregoing provisions of th [illegible] thorising movement of cattle shall interfe with the operation of any provision of the Act of 186 or of any Order of Council prohibiting or regulati the movement of cattle affected with a contagious infectious disease.

MARKETS, SALES, AND EXHIBITIONS.

17. No market, fair, auction, sale, or exhibition of cattle shall be held in the metropolis except under licence from the Privy Council.

If any person holds a market, fair, auction, sale, or exhibition in contravention of this order, or fails to comply with any of the conditions, provisions, or regulations of any licence for the holding of a market, fair, auction, sale, or exhibition, he shall be deemed guilty of an offence against this Order.

If any cattle are sold, or exposed or put up for sale, or exhibited, in contravention of this order, the seller and the purchaser thereof, and the auctioneer, if any, putting up the same for sale, and the person exposing the same for sale, or exhibiting the same, shall each be deemed guilty of an offence against this order.

18. Cattle exposed for sale in a market in the metropolis, licensed by the Privy Council for the sale of cattle for immediate slaughter, may be kept alive for ten days after such exposure, exclusive of the day of such exposure, but no longer; but this article shall not interfere with the operation of any provision of this or any other Order of Council relative to the slaughter of foreign cattle.

SLAUGHTER-HOUSES.

19. The proprietor of a slaughter-house in the metropolis shall not receive for slaughter any cattle without receiving from the person delivering such cattle to him, or from the owner thereof, the market pass or licence of the Commissioner of Police under which they have been moved.

20. On the Saturday of every week the proprietor of each slaughter-house in the metropolis shall deliver to the chief officer in charge of the police-station of the district in which the slaughter-house is situate, all the market passes and licences received by him during the week, and such officer shall give a receipt for the same signed by him to the proprietor.

FOOT-AND-MOUTH DISEASE.

21. The following provisions shall apply to cattle becoming affected with the foot-and-mouth disease in the metropolis :—

1. If they become affected while in a lair they may be moved therefrom with a licence of the Commissioners of Police to a slaughter-house designated in the licence.
2. If they become affected while in the Metropolitan Cattle Market they may be moved therefrom with a market pass to a slaughter-house designated in the pass.

INFECTED PLACES.

22. Any dung of animals, and any hay, straw, litter, or other thing, commonly used for food of animals or otherwise for or about animals, may be moved out of an infected place within the metropolis (but not out of the metropolis) with a licence signed by an officer of the local authority appointed in that behalf, certifying that the thing moved has been disinfected, but not otherwise.

GENERAL PROVISIONS.

23. If any cattle or thing are or is moved or dealt with in contravention of this order, the owner thereof and the person directing or permitting such moving thereof or dealing therewith, and the person or company in charge of or removing or conveying the same, and in the case of cattle brought into the metropolis by railway, and by this order authorised to be moved out of the metropolis by railway, the railway company by whose railway the cattle were brought into the metropolis shall each be deemed guilty of an offence against this order.

24. If the proprietor of a slaughter-house fails to comply with any provision of this order, he shall be deemed guilty of an offence against this order.

25. The Commissioner of Police of the metropolis and of the city of London respectively (who respectively are in this order referred to as the Commissioner of Police), are hereby empowered from time to time to grant licences for the purposes of and in conformity with this order, and if they think fit to revoke any such licence granted by them respectively.

Every licence for movement so granted shall state the number and description of the cattle licensed to be moved and the place of their destination.

26. Every licence of the Privy Council for the holding of a market or for lairs, and every licence for the movement of cattle or for any other purpose, granted before the making of this order by the Commissioner of Police, or by the local authority, or any of their officers on their behalf, or by any other person authorised to grant the same, and in force at the date of this order, shall continue in force thereafter as if this order had not been made, and shall be available in like manner, to all intents, for the purpose for which it was granted, as if it had been granted under this order.

27. The Metropolitan Board of Works shall cause this order to be published in a newspaper circulating in the metropolis; and the Mayor, Aldermen, and Commons of the city of London shall cause a copy thereof to be affixed in a conspicuous place in the Metropolitan Cattle Market; and the Commissioners of Police respectively shall cause a copy thereof to be affixed in a conspicuous place at each police station.

ARTHUR HELPS.

THE FIRST SCHEDULE.

Pass No. ——

METROPOLITAN CATTLE MARKET PASS.

The following cattle being of those brought to be sold in the

METROPOLITAN CATTLE MARKET,

this day by from under the licence numbered , and retained by the officer of the market appointed for the purpose, may be moved to within the limits of the metropolis (inclusive of the city of London and the liberties thereof) but not beyond, by the under-mentioned route, and no other:—

	Number and Description of the Cattle.	Name and Address or Place of Business of the Owner or Purchaser moving the Cattle.	Route.	Name of Occupier, and Address and Description of the Slaughter house to which the Cattle are to be moved for Slaughter.	Route.	Name of Drover and Number of his Badge.	Remarks.
British	Beasts .						
	Calves .						
Foreign	Beasts .						
	Calves .						

This pass will not authorise movement, in case of foreign cattle, after eleven days from the day of landing, inclusive, or in case of other cattle, after eleven days from the day of the date hereof, inclusive.

This pass must be delivered to the proprietor or person in charge of the slaughter-house to which these cattle are taken.

(Signed, with date)

Appointed to grant passes at the above-named market.

Caution.—Persons who fabricate or commit other offences with respect to these passes are liable, under Act of Parliament, to fine or imprisonment.

THE SECOND SCHEDULE.

GREAT NORTHERN.

By the Great Northern Railway to its junction with the Metropolitan Railway, and thence as follows: either,

1. By the Metropolitan Railway to its junction with the London, Chatham, and Dover Railway, and by the last-mentioned Railway through Herne Hill Station out of the metropolis; or

2. By the Metropolitan Railway to its junction with the London, Chatham, and Dover Railway, and by the last-mentioned railway to Beckenham Junction, and thence by the South-Eastern Railway out of the metropolis; or

3. By the Metropolitan Railway to its junction with the London, Chatham, and Dover Railway, and by the last-mentioned railway to its junction with the London, Brighton, and South Coast Railway, a [illegible] [illegible] thence by the last-mentioned [illegible]

[illegible]

[illegible] Dover Railway [illegible] Long Hedge [illegible] by the last-mentioned rai[illegible] out of the metropolis; or

[illegible] the West London Railway to Clapham Junction, and thence by the London and Sout Western Railway out of the metropolis; or

3. By the West London Railway to its juncti with the London, Brighton, and South Coast Railwa at or near Long Hedge, and thence by the last-me tioned railway out of the metropolis; or

4. By the West London Railway to Willesd Station, and thence by the London and North-We ern Railway out of the metropolis.

LONDON AND NORTH-WESTERN.

By the London and North-Western Railway Willesden Station, and thence as follows: either,

1. By the West London Railway to the juncti with the London, Chatham, and Dover Railway, a with the London, Brighton, and South Coast Railwa at or near Long Hedge, and thence by either of t last-mentioned railways out of the metropolis; or

2. By the North and South-Western Junction Ra way out of the metropolis; or

3. By the West London Railway to its juncti with the London, Chatham, and Dover Railway, at near Long Hedge, and thence by the last-mention railway to Beckenham Junction, and thence by t South-Eastern Railway out of the metropolis.

LONDON AND SOUTH-WESTERN.

1. By the London and South-Western Railway Clapham Junction, and thence by the West Lond Extension and the West London Railways to Will den Station, and thence by the London and Nort Western Railway out of the metropolis; or

2. By the North and South-Western Junction Ra way to Willesden Station, and thence by the Lond and North-Western Railway out of the metropoli or

3. By the London and South-Western Railway Clapham Junction, and thence by the Londo Chatham, and Dover Railway, through Long Hed Junction and Herne Hill Station, out of the metr polis.

MIDLAND.

By the Midland Railway to its junction with t Midland and South-Western Junction Railway ne Hendon, and thence by the last-mentioned railway its junction with the North and South-Western Jun tion Railway, and thence by the last-mentioned ra out of the metropolis; or

[illegible] By the Midland Railway to its junction with t Metropolitan Railway, and thence by the la mentioned railway to its junction with the Londo Chatham, and Dover Railway, and thence as follow

[illegible] By the last-mentioned railway through Her Hill Station out of the metropolis; or

[illegible] By the same railway to Beckenham Junctio and thence by the South-Eastern Railway out of t metropolis; or

3. By the London, Chatham, and Dover Railw

to its junction with the London, Brighton, and South Coast Railway, at or near Battersea, and thence by the last-mentioned railway out of the metropolis.

LONDON.

At the Council Chamber, Whitehall, the 10th day of August, 1869. By the Lords of her Majesty's Most Honourable Privy Council. The Lords of her Majesty's Most Honourable Privy Council, by virtue and in exercise of the powers in them vested under the Contagious Diseases (Animals) Act, 1869, and of every other power enabling them in this behalf, do hereby define the parts of the port of London within which foreign cattle may be landed for slaughter, as :

1. Thames Haven, which is hereinafter referred to as the landing-place No. 1, and for this purpose shall be defined to be as follows :—

All that space in the parish of Fobbing, in the county of Essex, the property of the London, Tilbury, and Southend Railway Company, at the Thames Haven Station of that company, lying between the River Thames and a line commencing at a point on the River Thames at the south-western corner of the property of the said railway company, near the Thames Haven Station, and running in a north-westerly direction for a distance of 610 yards along the fence or boundary between the property of the railway company and lands of Mr Samuel Sharp, thence in a north-easterly direction along the eastern side of the carriage road across the Thames Haven branch of the London, Tilbury, and Southend Railway, to the northern fence of the railway, thence in a south-easterly direction along the fence or boundary between the property of the London, Tilbury, and Southend Railway Company and lands of Mr Samuel Sharp, to the River Thames, at a point 280 yards to the eastward of the new pier at Thames Haven, which space is coloured green on the plan thereof deposited for the purposes of an Order of Council of the 11th day of October 1869, at the Privy Council Office, copies whereof are deposited at the offices of the clerk of the peace for the county of Essex, and of the Metropolitan Board of Works.

2. The landing-place, which is commonly called Odams's Wharf, and which is hereinafter referred to as the landing-place No. 2, and for this purpose shall be defined to be as follows :—

All that space on the Plaistow Marshes, near the Victoria Docks, in the parish of West Ham, and county of Essex, bounded on the north-east side, for a distance of 200 yards or thereabouts, by the old line of tramway or railway from London to North Woolwich ; on the south-western side, for a distance of 200 yards or thereabouts, by the River Thames ; on the north-western side by premises used as a sugar bakery, in the occupation of Mr James Duncan, and on the south-eastern side by the wall forming the north-western boundary of the premises in the occupation of the London Wharfing and Warehousing Company, which space is coloured pink on the plan thereof deposited for the purposes of the said order, at th
Privy Council Offices, copies whereof are deposite
at the offices of the clerk of the peace for th
county of Essex, and of the Metropolitan Board
Works.

3. The Victoria Docks, which is hereinafter referre
to as the landing-place No. 3, and for this purpo
shall be defined to be as follows :—

All that space situated at the Victoria Docks, in th
parish of West Ham, in the county of Essex, bounde
on a portion of its south-western side by the Riv
Thames, and on all other sides and parts by a li
commencing on the River Thames, at the north-we
pier of the entrance lock of the Victoria Docks, a
running in an easterly and northerly direction alo
the boundary fence of the Victoria Docks to the e
treme north-western corner of the dock property, ne
the Tidal Basin Station of the North Woolwich Rai
way; thence eastward for a distance of 307 yards alo
a continuation of the said boundary fence, to t
north-western corner of the tobacco warehouse, then
in a southerly direction by a straight line along t
western wall of the tobacco warehouse, and along t
eastern wall of the tidal basin, and by a continuati
of the same straight line to the fence forming t
southern boundary of the dock premises, thence in
westerly direction along the last-mentioned fence
the River Thames, at the south-east pier of the e
trance lock of the Victoria Docks, which space
coloured green on the plan thereof deposited for t
purposes of the said order at the Privy Council Offic
copies whereof are deposited at the offices of the cle
of the peace for the county of Essex and of the Metr
politan Board of Works.

4. The landing-place, which is commonly call
Brown's Wharf, and which is hereinafter referred
as the landing-place No. 4, and for this purpose sh
be defined as follows :—

All that space in the parish of Poplar, in the coun
of Middlesex, lying between the River Thames and
line commencing at the said river, at the eastern poi
of the pier head, on the north side of the Blackw
entrance of the East and West India Docks, and pas
ing in a north-westerly direction to the eastern side
Preston's Road, at a point 55 yards to the south of t
south-western corner of Russell Street, thence co
tinuing westward across Preston's Road to the sout
eastern corner of the railway dock, belonging to t
the North London Railway Company, thence conti
ing westward along the southern end of the sa
railway dock to the south-western corner there
thence passing straight in a north-westerly directi
for a distance of 235 yards, to a point 50 yards d
east of the northern end of the open ditch lying b
tween the import dock of the East and West Ind
Dock Company and the railway dock, the property
the North London Railway Company, thence westwa
to the northern end of the said open ditch, then
southward along the western side of the said ditch f
a distance of 141 yards, thence due east for a distan

of 19 yards to the south-western corner of the North London Railway Company's boundary fence, then eastward along the said railway company's boundary fence to a point 13 yards to the westward of the western side of the lock between the railway company's dock and the Blackwall basin, thence straight in a south-easterly direction to the north-eastern corner of the premises known as Lloyd's Proving House, thence southward along the eastern side of Lloyd's Proving House, to the south-western corner thereof, thence in a south-easterly direction to the water of the lock of the eastern entrance of the East and West India Dock Company's South Dock, at the north-eastern end of the bridge which crosses the said lock; thence eastward along the northern side of the water of the lock and of the eastern entrance of the South Dock to the River Thames, which space is coloured green on the plan of the East and West India Docks and Poplar Goods Station, deposited for the purposes of an order of the 7th day of November 1867, at the Privy Council office, copies whereof are deposited at the offices of the clerk of the peace for the county of Middlesex, and of the Metropolitan Board of Works.

And the Lords of the Council do hereby prescribe as follows:—

1. Regulation six of the Fourth Schedule to the Contagious Diseases (Animals) Act, 1869, shall not apply to cattle landed within the several landing-places aforesaid.

2. The cattle landed at the landing-place No. 1, when removed therefrom, shall be removed by the following route, namely:—

By the London, Tilbury, and Southend Railway to Forest Gate, near Stratford, thence by the Great Eastern Railway to the metropolis.

And the cattle landed at the landing-place No. 2, when removed therefrom, shall be removed by the following route, namely:—

Along a siding of the North Woolwich Railw which is part of the Great Eastern Railway, to t Barking Road Station, thence by the Great Easte Railway to the metropolis.

And the cattle landed at the landing-place No. when removed therefrom, shall be removed by t following route, namely:—

Along siding running direct on to the North Wo wich Railway, which is part of the Great Easte Railway, to the Barking Road Station, thence by t Great Eastern Railway to the metropolis.

And the cattle landed at the landing-place No. when removed therefrom, shall be removed by the f lowing route, namely:—

Along a siding of the North London Railway to t main line thereof, and thence along the North Lond Railway, by way of Bow and Hackney.

3. All foreign cattle so conveyed by railway sh be brought along the said railways without stoppin and shall be discharged, from the trucks in which th have been conveyed, at a station or place within 10 yards of the Metropolitan Cattle Market at Islingto and shall be driven immediately, on being so di charged, to that market, or to the lairs belongin thereto, or to other lairs licensed by the Privy Cou cil for the reception of such cattle.

ARTHUR HELPS.

Then follow a series of Orders defining the boun aries within the following ports within which forei cattle may be landed for slaughter, viz.:—Chichest Bristol, Cowes, Dover, Hartlepool, Harwich, Hu Newcastle-upon-Tyne, Plymouth, North Shiel Shoreham, Southampton, Granton, Leith, Glasgo Middlesborough, Portsmouth, Grimsby, Dartmout Littlehampton, Sunderland, Goole, and Liverpool.

AGRICULTURAL RETURNS FOR 1869,

WE have received, from the Statistical Department of the Board of Trade, the agricultural returns for Great Britain, excluding Ireland, for the year 1869.

It has not been practicable to obtain from all parts of England and Wales the information necessary for the completion of the returns for this year until the present date. With the view of making known, as early as possible, the chief results exhibited by the returns, the following particulars are furnished in anticipation of returns in detail:—The extent of land under wheat in Great Britain this year has been 3,695,030 acres, as compared with 3,652,115 acres in 1868, and 3,367,776 acres in 1867, representing an increase this year over last of 42,905 acres, or 1.2 per cent., and an increase of [illegible] 054 acres, or 0.7 per cent., between 1867 and 18[illegible] there has been this year ,256,077 acres under this grain crop, as compar with 2,151,224 acres in 1868, and 2,259,1 acres in 1867. This represents an increase 104,853 acres, or 4.9 per cent. this year as again 1868, but a decrease of 2987 acres, or 0.1 per cent between 1867 and 1869. The acreage under oats h this year been 2,785,054, as compared with 2,757,0 in 1868, and 2,750,487 in 1867—shewing an increa of 28,001 acres, or 1.0 per cent. this year as compar with last, and an increase of 34,567 acres, or 1.3 p cent. between 1867 and 1869. The growth of pot toes this year has been exceedingly large. The acrea under this description of crop has been 586,361 i 1869, as compared with 541,543 in 1868, and 492,2 in 1867—thus representing an increase of 44,758 acre or 8.3 per cent. this year over the last, and 94,0 acres, or 19.1 per cent., between 1867 and 1869 every description of live stock there is this year crease. The cattle in Great Britain on 25th June numbered 5,316,588 as compared with 5,423,981 68, and 4,993,034 in 1867, representing a decrease 7,393, or 2.1 per cent. this year as compared with last, though an increase of 323,554 or 6.5 per cent. the year 1867. There appears to have been on same day 29,580,954 sheep, as compared with 11,396 in 1868, and 28,919,101 in 1867—thus ving a decrease of not less 1,130,442, or 3.7 per cent. in the present year over 1868, though an increase of 661,853 sheep, or 2.3 per cent. over 1867. The number of pigs on the 25th June last, in Great Britain, was 1,931,837, as compared with 2,308,539 last year, and 2,966,979 in 1867—thus exhibiting a decrease of 376,702, or 16.3 per cent., in the present year in comparison with last year, and a decrease of 1,035,142, or 34.9 per cent. between 1867 and 1869.

The acreage of land under hops in 1869 was 61,784, against 64,488 in 1868, and 64,284 in 1867.

IRISH AGRICULTURAL STATISTICS.

'HE agricultural returns of the Registrar-Genera for Ireland for the year 1869 are issued. The eral abstracts exhibit the acreage under the several s, and the number of live stock in each county ing the year. From the returns we learn that the l area under crop of all kinds this year is 5,575,843 s, which gives an increase of 27,872 acres as comed with 1868, when there was under cultivation 7,971 acres. The crops which shew an *increase* year are :—

Barley	34,501 acres.
Potatoes. . . .	7,156 ,,
Turnips	1,786 ,,
Mangold and beet . .	2,018 ,,
Vetches and rape . .	2,355 ,,
Flax	22,695 ,,
Total increase . .	71,894 acres.

e other side of the account, however, gives a *rease* of 44,022 acres, which is distributed thus :—

Wheat	4,033 acres.
Oats	18,857 ,,
Beans and peas . .	3 ,,
Carrots, parsnips, &c. .	58 ,,
Cabbage	736 ,,
Meadow and clover . .	22,336 ,,
Total decrease this year	44,023 acres.

us, while the *increased* acreage put under cultivation, ertain crops, during the year is 71,894 acres, there been a decrease of other crops to the extent of 022, which reduces the *net increase* in the area under crops to 27,872. From summaries, it appears that eat decreased by 4033 acres, oats by 16,857 acres, l beans and peas by 3 acres. Barley increased by 591 acres, and bere and rye by 1293 acres. Potatoes reased by 7156 acres, turnips by 1786, mangold and t-root by 2018, and vetches and rape by 2355 acres. Cabbage decreased by 736 acres, carrots, parsnips, and other green crops by 58 acres, and meadow and clover by 22,335 acres. Flax increased by 22,695 acres. The following comparative abstracts relative to the cereal crops shew the average under the several crops specified for 1868 and 1869 :—

	1868. Acres.	1869. Acres.
Wheat . .	285,150	281,117
Oats . .	1,701,645	1,684,788
Barley . .	186,318	228,909
Bere and rye .	9,906	11,199
Beans and peas .	9,960	9,957
Total . .	2,192,979	2,207,970

A similar return for green crops is given, which establishes the following results :—

	1868. Acres.	1869. Acres.
Potatoes	1,034,681	1,041,837
Turnips	320,094	311,880
Mangold wurtzel and beetroot	19,109	21,127
Carrots, parsnips, and other green crops . .	26,622	26,564
Vetches and rape . .	22,993	25,348
Total . . .	1,456,374	1,468,895

From these figures we find that in cereal crops for the year 1869 there is an increase of 14,991 acres as compared with 1868; of green crops, an increase of 12,521 acres; and of flax, of 22,695 acres; while meadow and clover shew a decrease of 22,325 acres. In live stock, we have an increase of 2545 horses, 80,998 cattle, and 210,215 pigs, as compared with last year. Sheep, however, we are sorry to see shew a decrease of 253,338. The total estimate of horses, cattle, sheep, and pigs this year is £34,911,360, being an increase of £530,944 as compared with the year 1868.

Papers by Tim Bunker.

NO. IX.—TIM BUNKER AT THE SHOW, AND HOW HE TOOK THE PRIZES.

"TAKING in your cabbages then, this morning, Squire Bunker," said Seth Twiggs, as he looked over the garden fence, and saw Tim very busy. The smoke curled up from his pipe, and both hands were thrust into his waistcoat pockets, as he stood with his weight poised upon one leg, and both ears opened.

"Oh, it is you, is it, Seth," said Tim, as he deposited the last cabbage in the basket. "Did you hear how I came off at the show yesterday?"

"Not exactly. I kind o' thought it wouldn't be strange if them carrots of you'rn got a premium."

"Carrots, man! why I made a clean sweep, and got a premium on everything I carried. Had the grandest time I and my family ever experienced. You ought to have been there, Mr Twiggs, to see Hookertown in its glory. First, you see, our town train was made up of seventy-one yoke of oxen, besides Jim Latham's steer train of five yoke, which the committee said would not count. This was bigger than anything upon the ground, and took a prize. Then Deacon Smith's fat pair of cattle that weighed 5000 lb. upon the hoof, could not be beat. He also had some Southdown wethers that weighed near 200 lb. apiece, and were said [illegible] the finest fat sheep ever exhibited [illegible]

"But [illegible] was going to tell you [illegible] Mr Bunker's big cabbage [illegible] [illegible] Seth [illegible] and [illegible] had [illegible] manured with fish, and calculated he should make a clear sweep on the vegetables, cabbages in particular. The fellow got a premium on potatoes, whi seemed to comfort him some."

"Whurra for our side!" exclaimed Set swinging his beaver.

"But I hain't done with the women y You see our Sally made up a batch of bre out of the new wheat that I raised on Sto Hill. It was ground over to the city, so th the whole stuff was Hookertown manufactu from top to bottom—wheat, flour, yeast, a the girl that made it. And who'd 'a thoug Seth, that same loaf took the premium."

"Didn't the gal blush when it was rea off?" inquired Seth.

"I shouldn't wonder if she did; b whether it was about the bread, or one the ministers that was on the committee, couldn't say. They do say that the youn man they have just settled in Shadtown, i mighty fond of exchanging with our ma and that Sally's singing is very much to hi mind. But that had nothing to do with th premium, for it never got round that th bread was made of Hookertown flour, unt after the premiums were read off. Then you see, I let the cat out of the bag, an told them that No. 5 was made out of ou home-made flour by our Sally.

"John's onions, too, came out just as the were labelled, No. 1, and the boy has got th money for them in his pocket. His Breme geese were the largest exhibited, and th white Dorkings could not be beat. Yo know our Suffolk pigs; I had them a washed up the day before the show, and the were clean enough to go into the pork barr all alive. They were the best lot exhibited

There was a good deal of competition o vegetables. One man brought a hundre varieties, and another ninety-one. My ca rots were hard run, and the committe declared that they were a good deal bothere to know how to decide, and I guess the so. But you see my star was in the ns that day, and my carrots took the That is what I call doing pretty well. isn't a circumstance to what I shall do I'm bound to lay myself out at the ;how."

:.—TIM BUNKER ON HORSE-JUMPING AT SHOWS.

ım not much used to writing letters y kind, much less letters for the s. But I see you are reporting con-ble many of my sayings in your paper, thought if you were bent upon having otions circulated, you might as well :hem direct from the fountain head, as /e them come in a round-about way.

have got a great notion of the agricul-and horticultural Societies, and of the ; that come off every year. They please .nity somewhat, and are doing a heap of in waking folks up to a better kind of ıg. All sorts of folks come to them, he better part of the community espe-It seems as if we had got one thing we could all be agreed on. There considerable split on religion, and :s always stir up a deal of bad feeling. it seems to me that these shows are just we want to draw all kinds of people to-, and to keep up good neighbourhood. .st as soon as you bring in horse-jump-.nd make that a part of the show, :e, a multitude of people won't stand it w. It does seem as if the devil was ; around when folks are trying to start d enterprise, getting up something to it all over. Deacon Smith, you see, ıral improver, goes in for good horses, ıttle, and all that sort of thing. He lown to attend the show, and especially the horses. Guess how mortified he vhen he got among the noble animals ›und jockeys, gamblers, and betting round him, thick as flies in Hooker-in fish time. You see the Deacon ›t be caught in such a scrape agin.

r I don't suppose there is any objection ing a ring upon the show grounds, and ring horses around on a pretty good jog, but I can't see how it is going to make us breed any better horses to have a regular jumping match, and to have all the gamblers and fancy men in the country drawn together to see the sport. It strikes me that gamblers would be made much faster than good horses by such exhibitions.

Just to shew you how the thing works, I will tell you about my John. You see the boy has been at work hard all the season, and I thought I would let him go down with the Deacon, to see the fine horses. When the boy came home, I found he had been making a bet on "Bluegown," and was cracking about the horse as raging as an old gamester. You see the boy was young, and his father was not with him. It won't be safe for a man to take his family to the shows if they are going to be turned into race-courses. Good people will be dead set agin them, and the first thing we shall know, all the pulpits in Hookertown will be blowing away at the shows for horse-racing and gambling. Now, you see, I don't belong to the meeting myself, and am not so good as I ought to be, but I can see the bearing of horse-jumping on the morals of the community. When a man's boy gets to betting at a show, you see, it brings the matter straight home, and there is no blinding a man's eyes to the facts in the case. If the ministers come out agin this kind of agricultural exhibition, they will have the right on their side, and will be certain to carry the day. It is no kind of use to approve a thing that is not right. So you see I give you a bit of my mind.—Yours agin horse-jumping,

TIMOTHY BUNKER, ESQ.

NO. XI.—TIM BUNKER AT THE FARMERS' CLUB.

HIS VIEW ON THE CHINESE POTATO AND MIXED NEWSPAPERS.

Hookertown has at length a Farmers' Club, and it may be regarded as one of the permanent institutions of that happy people. The farmers in this locality are proverbially cautious, and not carried about by every "wind of doctrine," whether in husbandry or in religion. But when a thing is done, it is generally well done, and will last until there is good reason for doing it away. The thing had been talked of by Deacon Smith and the minister, Rev. Jacob Spooner, for at least a year beforehand. They both agreed it would be a good thing in every point of view, if the people could only be brought to attend it. But there were so few agricultural papers taken in the place, that they doubted whether there was interest enough felt in the matter to sustain weekly meetings. So they let the matter rest until a Club should seem to be called for by public sentiment.

Rev. Jacob Spooner, the able and efficient pastor of Hookertown, is somewhat past his prime, though one might easily take him for a man ten years younger than he is. For forty years he has held his office, and moulded public sentiment upon all secular topics, as well as upon religion. He is a good sample of a Puritan pastor of the present generation. He is regarded as timid by many of his juniors in the ministry, and altogether too cautious in the positions he takes in regard to the novelties of the day. But this reserve is the result of experience and age. He has seen the breakers, and knows more of the perils of a minister's life than his younger brethren. He is undoubtedly conservative, but not from any lack of moral courage. He has sometimes gone before public opinion in his parish, and knows something of the difficulties of bringing over a community to new opinions and customs. He always means to move in the right direction himself, and in his later years has thought it best, on the whole, to work in private for any new measure on which he had set his heart, before he committed himself to it in public. His shadow fills the place pretty well, and he is sometimes a little afraid of it, but nobody ever knew him to hold back from a thing that was really good and praiseworthy. When public sentiment is prepared by his "in-door work," as he calls it, the measure is pushed with [illegible] deal of vigour.

A F[illegible] Club in Hookertown was a fixed fact in this man's mind a year ago, and [illegible] wise way of making haste slowly. He wanted to say the righ thing to Timothy Bunker, Esq., and his wif Sally, in his pastoral visits, and speak of th Club as a thing likely to turn up anothe season, if the farmers would take hold of i He also had a few words to say to Set Twiggs, John Tinker, and Tom Jones, an their neighbours, which would prove as goo seed in good soil for his purposes.

These private talks of the minister, t gether with the shows and the agricultur papers, had stirred up a good deal of intere in the community, so that everybody wa prepared to see the notice stuck up on th church door in Hookertown, that the farme and cultivators would hold a Club meeting the school house, on the first Tuesday even ing in December. The subject announce for discussion was the "Dioscorea Batata or Chinese Potato."

The appointed evening came, and th school-house, when the orthodox hour early candle-light appeared, revealed som five-and-twenty of the farmers, mechanic and professional men of the town.

Deacon Smith was appointed Chairma and as the proceedings were not designe for the public, it was concluded to foreg the usual ceremony of appointing a cler The Chairman laid the subject for discussio before the meeting, and called upon gentl men for their views of the distinguishe stranger.

He said the topic had excited considerab interest among cultivators, and a good de had been said about it in the papers. nurseryman of distinction had claimed for remarkable virtues, and had threatened drive out all known esculents with it from t country. Great pains had been taken disseminate the tubers, and he had learn that some of the tin boxes were import into Hookertown last spring. He had unde stood that gentlemen would be present th evening, who would relate their experienc The meeting was open for remarks.

Squire Bronson said he supposed the all sion to the tin boxes probably meant hi and he had to confess that he had last Ap purchased one of those articles. The co tents, he said, were sand, and a dozen black looking articles, a little bigger than peppercorns, that looked about as likely to sprout as so many crumbs of bread. He said his faith leaned hard upon a pamphlet containing a beautiful illustration of the tuber and a glowing description of its virtues and productiveness. He thought it was worth trying, and had tried it quite as thoroughly as any case he had ever tried in court, and by ordinary rules of evidence, he was constrained to pronounce the claims put forth a great humbug, whatever might be said of the tuber itself.

Rev. Mr Slocum, of Shadtown, next addressed the meeting. This gentleman's exchanges with the Hookertown minister have been more frequent of late, and as he always stops at Squire Bunker's, it is mistrusted that something beside the Farmers' Club made him stay over to attend this meeting. Perhaps Sally Bunker knows about that; your reporter does not. He said that he had received one of the pamphlets which Squire Bronson had mentioned, and from what he could learn at the minister's meetings, the work was pretty extensively distributed among the clergy last winter. Whether the operators in tubers thought that an unusual share of the green ones was to be found among the clergy, he could not say. Probably that view of their character had something to do with the liberal share of pamphlets bestowed upon them. He was happy to state, however, that very few of his brethren had been caught in the trap, and those who had fooled away their money were best able to bear it. Gentlemen who had tried the new yam in his parish were disappointed with its performance, and thought it a swindle.

This brought up old Jotham Sparrowgrass, the distinguished uncle of Jeremiah, the clerk, who made such a figure shooting robins last summer, in Tim Bunker's cow pasture, as the readers of this magazine will remember. Jotham had grown envious of Squire Bunker's recent improvements and notoriety, and also of his neighbours, and though he was always running out against book farming and newfangled notions, he determined that for once he would steal a march upon them, and astonish the natives with potatoes a yard long. As soon as he saw the notices of the Dioscorea in certain leading political papers, he determined upon a venture, and ordered a dozen through his nephew, Jeremiah Sparrowgrass.

"Swindle!" echoed uncle Jotham, as he rose and struck his cane upon the floor, "there has not been such piece of rascality afloat since the blue tulip fever. I got caught *then* with a Chinaman, and vowed I never would have anything more to do with book-farming. But those stories in my newspaper looked so mighty plausible, that I was taken in agin. You see, if they had been in an agricultural paper, I wouldn't have read them. But coming in a political paper, I thought they were all right. But I have now come to the conclusion that there is a mighty difference between potatoes and politics. A man sound in politics may be a blind guide in vegetables. Why, them things cost me a heap of money, they did not half come up, and what did come up might as well have stayed down, they were such thin, stringy consarns. Potatoes a yard long, and a rod of ground supporting a family! Why, at the rate mine yielded, it would take an acre of 'm to support a pig, and if the one our folks cooked was a fair sample, the pigs might have 'em and welcome."

Tim Bunker, Esq., here got the floor, and, with a side glance at Jotham, said: "It would be well if cultivators who were going into new things would take a reliable agricultural paper, published by men who understand the business, and have access to the best sources of information in regard to the novelties that come out. He was not caught in this humbug, thanks to the *Farmer*, which gave timely warning to all its readers last winter. The fact is, there is too much of a disposition to mix up things in the papers. I think a political paper better stick to politics and news, and a religious paper stick to religion and missions, and when we have a farmers' paper, let the editor stick to his text, and not hash up potatoes with love stories. I don't mean to reflect upon any rural paper in particular. For my part, I want a simple diet in my paper as well as on my table. Then I know pretty much what I have got before me, and it is all plain sailing. But you see this China potato first got a going in a political paper, and folks swallowed it whole as if it was all according to Cocker. But you see, the fellow that wrote about it was a cute chap, cyphering up a good speculation for himself, instead of calculating for the good of the public. The fellow promised too much by half. If he had only said he had got a good thing, and wanted folks to try it, it would have looked more reasonable. But when he came to talk about its feeding all China, and that it was soon going to feed every body else, it was going a leetle too far. The funniest part of the whole story was, that he expected ministers were such greenhorns as to believe the whole of it, just as if the doctrine of total depravity had never been heard of in Hookertown. The only safe way for us to avoid humbugs is to take a good agricultural paper, and keep up with the times."

Meeting adjourned.

NO. XII.—TIM BUNKER ON GOOD AND BAD SEED.

AN OLD SAW ILLUSTRATED.

Mr Editor,—You need not think that any of my neighbours have grown envious of my getting the premiums, and you need not suppose I am going to write about a *saw*, though it's a very convenient tool about a farmer's workshop. But you see there is a saying, "penny wise pound foolish," that is always a see-sawing up and down in some folks' mouths [illegible] they call an old saw, as they do all such proverbs. I expect that all [illegible] the teetering [illegible] going to bring [illegible] old p[illegible] penny wise and pound foolish,' and putting it at one end of the plank, I mean to give some of the Hookertown people an airing on the other.

I wish some of our folks up here could look at themselves and their farming in a looking-glass, and just see what sort of work they are making. You see, every man thinks every man penny wise but himself. The looking-glass would often bring 'em right.

Uncle Jotham Sparrowgrass I s'pose never spent the value of fifty pence in his life for seeds of any kind before he went in for that China potato last year. He could not see, for the life of him, but what one kind of seed was about as good as another. The onion seed, and carrot and parsnip seed, that Mrs Sparrowgrass always saved and stored away in an old basket in the pantry, always came up and bore something, though the onions might have been mistaken for leeks, they were so little, and the other roots were hardly big enough to make a spile for the beer barrel. Everything else in his garden was just so. The parsnips, cabbage, and beets were all crossed, and ***run out*** as they call it and there was hardly a decent vegetable in his garden for want of good seed. He could not afford to buy it when he had it in th house—used to talk about hurting his wife' feelings if he should not use the seed she ha saved. That would have been less of a joke you see, if he had always been careful of he feelings on other occasions. Well, you see when he read those advertisements in yo paper last spring, he altered his mind som about potato seed, and thought he would p in for a dozen. He was going to be a poun wise man, and shew his neighbours som potatoes that were potatoes. Didn't h catch it, though! The Sparrowgrass fami have hardly had potatoes on the table sinc it is said they set bad on Uncle Jotham stomach.

Well, you see I tried this planting of see [illegible] from the odds and ends of th garden for rising of forty years, and I thi it is a penny wise business—my onions use to be scallions, my cabbages did not hea well, and the tap-roots would often run seed the first year. Last spring, you see, whe I went down to the market to sell my f cattle, I went to a first-rate seedsman, an spent about ten shillings in garden seeds.

s that seed, as well as the subsoil ploughing d manuring, that enabled me to take the miums at the show. Seth Twiggs came ng the day I was putting them into the d, and said:—"Waal, Squire Bunker, I w declare, I never saw such a sight of den stuff going into your shed afore!"

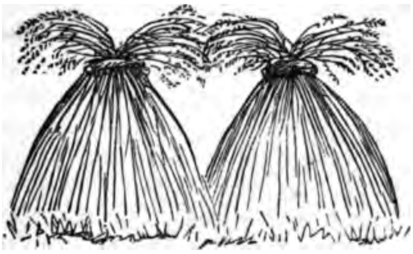
Seth was right. I never had such roots or bage heads. It was fun to pull them. d I have pretty much made up my mind t seed is one of the chief points in good ming. I think there is a difference of one quarter in the crop between good seed and poor. So, when I went down to the town this spring, I got another lot of seed at the same place. And I want to say to all your readers in Hookertown, that if they expect to compete with me at the show next year, they must burn up the old seed, papers, basket and all, and get the best in the market. It is a penny wise business to use poor old seed in the spring, and mighty pound foolish in the autumn.—Yours to command,

TIMOTHY BUNKER, ESQ.

Notes and Queries.

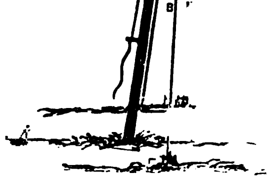
86. LAID CORN.

IN connexion with the articles which have lately appeared in this magazine on the subject of harvesting, it will be interesting to illustrate a method adopted in some parts of the Continent, for preventing the laying of corn by the action of heavy rains. It consists simply in tying certain portions of the standing corn which grow on the external sides of the field in the manner shewn in the illustration. It is certainly remarkable how a few parts tied up as shewn prevents the corn from being laid.



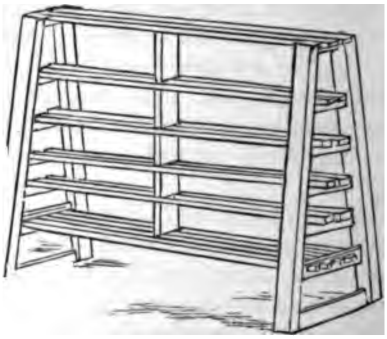
87. APPARATUS FOR STACKING.

The following simple and effective arrangement we take from an American journal. In the illustration *a* is the arm rope, *b*, *b*, *b*, the guy ropes, *c* the fork rope. The following is a description of the method of making and fitting up :—Get one good spar, say 40 feet long. [illegible] some light timber, dress it down so as to leave it strongest about 15 feet from top. Take a light [illegible] of timber 12 feet long (4 by 4 pine), and hinge it with iron, so as to allow it to rise and lower, o swing sideways fully two-thirds of the way round, fo arm ; run a five-eighths rope from the end of the arm to the top of pole, through a pulley made fast there down the pole, and fasten it on a pin for the purpos of raising and lowering the arm from the ground Fasten three guy ropes to the top of the pole and rais it, first digging a little hole a foot deep to keep the bottom of the pole in its place, and secure it by fastening ropes to stakes, one of which is driven directly behind the pole and the other two just fa enough ahead to keep it from falling backwards. The guy ropes should be 60 feet each. The pole should lean towards the stack, so that when the load comes on the crane it swings of its own accord to the centre. One of the fork-pulleys hangs on the end of the arm, one just under the arm on the pole, and one near the ground. The advantages obtained by this apparatus may be here named—1. A much larger rick can be built, and the hay pushed to any part of it easily by the stackers ; 2. All your hay is thrown in the middle of the rick, thereby preventing the settling of one side so as to lean the stack ; 3. It is taken from the ground without dragging against the side of the stack. With such acrane, ricks of 30 or more tons are put up very easily.



88. PROVISION RACK.

Conveniences in farm buildings for storing provisions, &c., are very frequently neglected in their planning, architects and builders too easily forgetting that a true housewife likes cupboards and [illegible] and plenty of them, with abundance of shelving. Where this is absent, a contrivance such as the present illustration shews, will be found very useful. It is the design of an American farmer, sent to an American journal, from the pages of which we



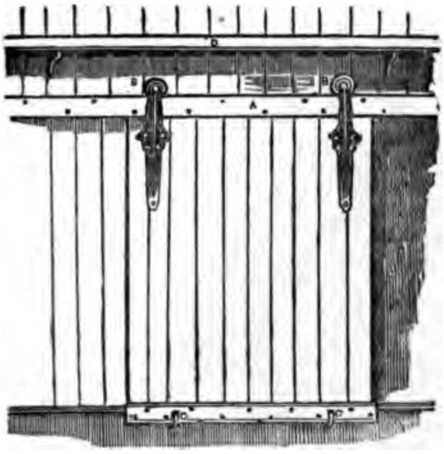
take it. The rack, as here shewn, will answer admirably for a dairy, as the milk cans will have abundance of air round them.

89. IS A BUSHEL OF BARLEY WORTH A BUSHEL OF MAIZE?

In the United States a bushel of barley is only 48 lb., and seldom comes up to the standard, while a bushel of maize is 56 lb., and generally overruns. So that even if 100 lb. of barley is as nutritious as 100 lb. of maize, which is doubtful, it would require 7 bushels of barley to be equal to 6 bushels of maize. A little barley meal mixed with maize meal for pigs is thought by many farmers to make more and better pork than maize alone.

90.—SLIDING BARNDOOR.

Where barn and other doors are wide, and the timber work consequently heavy and cumbersome to move, the hinges are apt to get rapidly out of order from the strain thrown upon them. In such cases it might be advisable to have the sliding gate or door. In this form the whole weight of the door is thrown upon the wheels and the beam upon which these run, as in the above illustration. The small penthouse roof, *d*, may be dispensed with, although it will be useful in preventing snow and wet from lodging in the wheel or roller beam. In the illustration, *b b*, the rollers, *d* the roof or cover to the track, and *c c*, iron hooks to hold the lower edge of the door on each side of the passage or opening. For an exposed gate or door, the lower edge should extend but slightly below the timber sill, or may run between two timbers, the span being open below and widening downwards, so as to allow dirt to drop freely, and some care will be necessary to keep it clear.

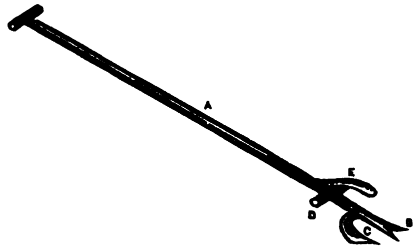


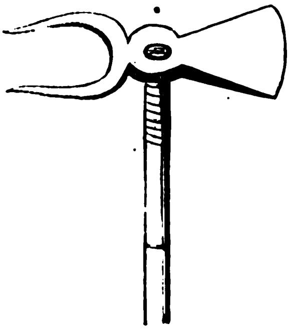
91. WHAT IS A BUSHEL OF SHELLED INDIAN CORN?

A great deal of difference of opinion prevails as to how many lbs. of Indian corn constitutes a bushel. Some people reckon 60 lb. to be the standard weight of a bushel in America, but the following list of relative weights, according to the various countries, we think is pretty correct. In California and Nevada, 52 lb. are a bushel of corn; in New York, 58 lb.; in all the other States, 56 lb.; in Canada and England, 60 lb. In a large part of N. Y. State, where farmers sell corn by the bushel, custom demands 60 lb.

92. IMPLEMENT FOR ROOTING OUT THISTLES.

In various articles which have appeared in our Magazine on the subject of weeding, than which none carries with it so much that is of practical importance; we have again and again recommended the plan of getting rid of such pests of the farm as docks and thistles, by rooting them up as the best way of dealing with them. The following represents an implement which will be found very useful in this direction. *A* is the handle; *b* the claws, between which the thistle is received; the curved iron, *c*, is the fulcrum, by means of which a purchase is obtained for extracting the root. *D* is an iron rod or bar upon which the foot is placed to thrust the claws into the ground. In case the root of the thistle break while endeavouring to extract it, the curved blade, *c* which has a sharp chisel-like end, is thrust into th ground in order to cut off the root some inches below the surface, and thus prevent it from vegetating The second figure represents the implement in use i the vineyards on the Rhine, which is exceedingly useful in getting rid of weeds and breaking up the soil.





93. FARM GATE.

For fields which are not frequently entered, or f those lying in remote parts of the farm, the pla of gate adopted in America, and illustrated as follows seems to be well adapted, and possesses some features of simplicity. Fig. 1 is a plan—the two posts *a* and *b* are to be placed in such position towards each other that the gate *c* will slide between them, and also turn 90 degrees, or at right angles to the line of the fence, the cross pieces on which must be nailed on the right side of the post *a* and on the left side of *b*. This cross piece should be 1½ inch thick when the gate timbe is 1 inch thick. The end pieces of the gate should b on the side opposite the post *a*, so as to slide by *a* an snug up to *b*. *D* is the latch post of the fence. A improvement is, to have a roller with flanges for th upper slot of the gate to run upon, as shewn in sectio in fig. 2, and with a side view in fig. 3. The shan under the roller enters an auger hole in the cross piec and turns in this hole as the gate is swung open o shut. The roller is of cast iron. Fig. 4 shews th whole contrivance, with the gate open.

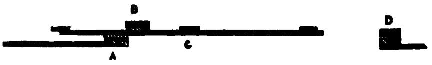


Fig. 1.

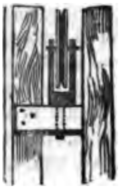


Fig. 2.

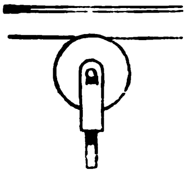


Fig. 3.

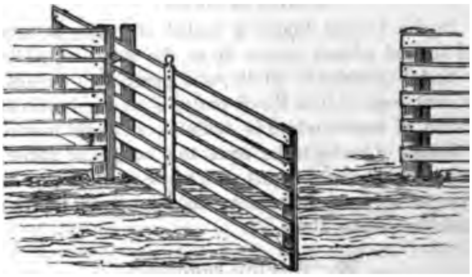


Fig. 4.

Our Library Table.

Ferns and Lycopods: British and Exotic. By . S. WILLIAMS (pp. 343). London, B. S. Villiams, Upper Holloway.

IIS welcome addition to the Nurseryman's Library contains descriptions of 900 choice s and varieties of Ferns and Lycopods, together lirections for their management in the tropical, rate, and hardy Fernery. Those belonging to the al department may be roughly stated to come west tropical Africa, including St Helena and sion, Mauritius, Ceylon, India, Malacca, the an-Archipelago, including Penang, Singapore, and the Philippines, Borneo, the Polynesian and islands of the Pacific within or near the tropics, wich Islands, tropical America, including Vene- , New Granada, Panama, Peru, Guiana, Brazil, he West Indies. It may be added, however, that species from high altitudes within these countries hrive in the temperate house. Species destined abit our temperate houses reach us from South pe, Madeira, South Africa, North India, China, Japan, Australia south of the tropics, Tasmania, Norfolk Island, New Zealand, Chili, and Mexico. A few species of the countries just named are, however, hardy, while some others improve under a higher temperature than that which the temperate house, properly so called, affords. For our hardy kinds of Ferns, we need scarcely say, we are indebted to North and Central Europe, including Great Britain and Ireland, North America, and North Asia. Under these three conditions, as regards temperature, all Ferns are capable of being cultivated in this country, and how to do this successfully is well set forth in the work before us. Descriptions of some 650 exotic species, selected from kinds now grown, are given as being worthy of general cultivation, and in the portion of the book devoted to our indigenous Ferns, about 250 species and varieties are enumerated and described.

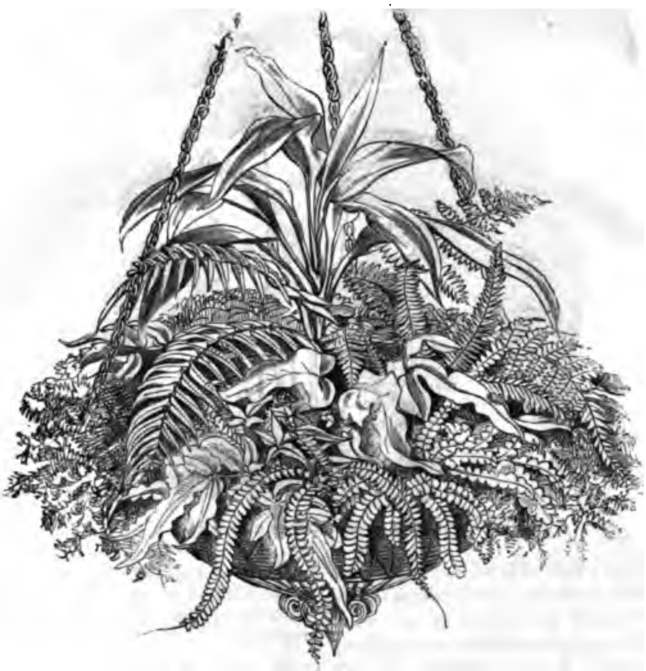


Fig. 1.—Basket for Ferns.

Speaking of basket Ferns, our author says that "some species, such as Goniophlebium subauriculatum, Cheilanthus spectabilis, &c., are magnificent objects when grown in this way, and add materially to the beauty and enjoyment of a Fern house. In a collection of Ferns grown in a natural manner, plenty of spots present themselves—such as overhanging or projecting portions of rockwork—where species of pendulous habit may be planted with fine effect, without resorting to baskets; but those not possessing the advantage of rockwork may beautify their houses by suspending the plants from their roofs." After alluding to a list of kinds adapted for suspension, Mr Williams goes on to say that "a great mistake, and one that is frequently fallen into in choosing a basket, is to select one with an elaborate design worked in or upon it; for, though it may look very pretty when purchased, if the plants thrive that are placed in it—and to this end they are so planted—no matter how

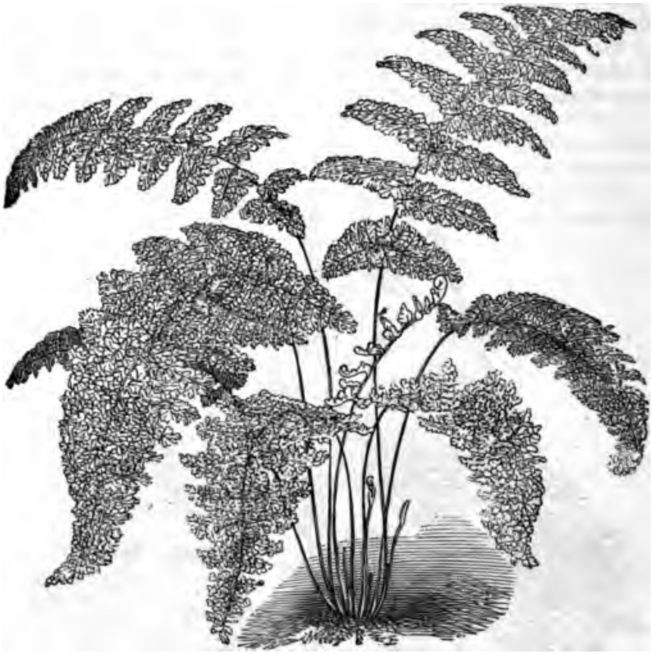


Fig. 2.—Cheilanthes elegans.

elegant the pattern, very little of it will be discernible. [illegible] not be imagined, however, that the shape should [illegible] What I recommend is the selec- [illegible] elegant outline, never heeding [illegible] outline is the only [illegible] plants are growing [illegible] recommend for [illegible] galvanised [illegible] not rust, they are reasonable in [illegible] and supply all that is needed of a basket. In preparing them for the plants, a thick layer of sphagnum moss should be placed next the wire at the sides [illegible] on the bottom, to prevent the soil from washing through. The compost best suited for this purpose is [illegible] mixture of fibrous peat and chopped sphagnum, with the addition of some silver sand and rough charcoal. After planting, the whole should be well soake with water before being placed in position; the plant will require and enjoy a gentle syringing over thei fronds every day during the summer months, and th baskets should be taken down two or three times in th course of a week to be thoroughly soaked with wate

"For the sitting-room windows of the dwelling house, also, Ferns suspended in baskets have a charming appearance, but here a little difference must b made in the kind of basket to be used. It may b constructed of any material, size, or pattern, and th Ferns, or other plants to be grown, must be planted i a zinc pan made to fit it, and thoroughly drained This prevents the disagreeable dripping of water whic had caused this style of indoor gardening to fall int bad repute. The ferns to be used in such situatio must be of a more hardy nature and constitution tha those adapted for the tropical Fern house, and shoul be selected from those which are natives of tempera regions."

As basket-fern growing, both for home decoratio and for purposes of exhibition, has of late been great on the increase, the remarks just quoted will, doubtless, be found useful, and the accompanying woodc is a good example of a basket filled and managed a cording to Mr Williams' recommendation (Fig. 1) p. 34

The following remarks on propagation may be inte esting to young cultivators :—

"Ferns are propagated in different ways, viz., by div sion and by spores. Many of them may be easily i creased. The best time of year for dividing the pla is March or April. Some of the species have a cree

audex, and are increased by cutting them into
;, each piece having a part of the root attached,
ome of the fronds. Other species are not so easy
opagate; their caudex is not creeping, but erect
tufted, forming single or compound crowns.
e must be cut apart with a sharp knife, and some

of the roots, with a portion of the fronds, should be attached to each other. After this, pull them to pieces with the hand, and pot in small pots. When potted, place them in a close frame till they are rooted; give but little water, just enough to settle the mould, and keep the frame shaded from the sun till they begin to root,

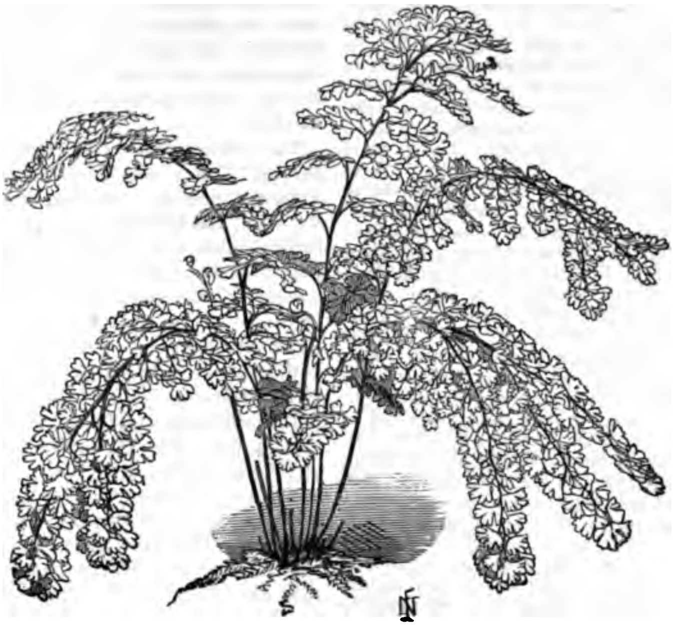


Fig. 3. Adiantum excisum multifidum

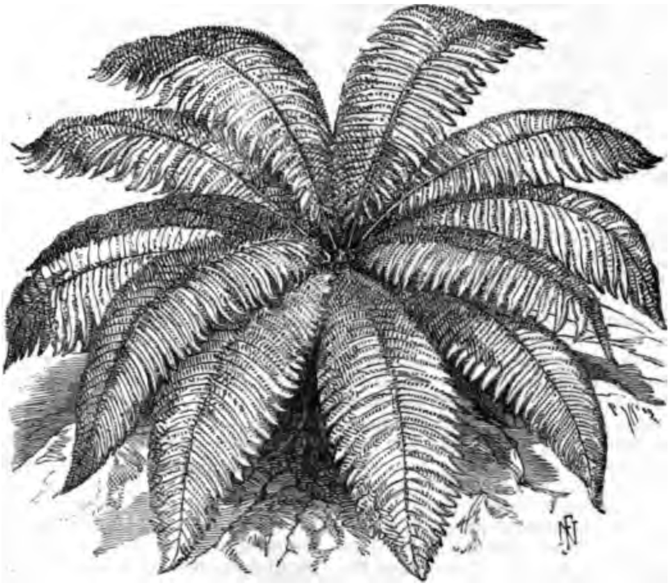


Fig. 4.—Todea superba.

when they may be moved into some cool shady place.

"Ferns may be raised from spores collected from the under sides of the fronds, and these should be gathered as soon as they are ripe. The best plan is to secure the frond just as the spore-cases are about to burst, and placing it in a piece of paper, put it under slight pressure in some dry warm place for a few days, by which time most of the spore-cases will have burst, and the spores will be ready for sowing. The spores of some species take a long time to germinate. I have known many of the arborescent kinds to be twelve or eighteen months before any sign of vitality appeared; others, such as Gymnogrammas, and some Adiantums and Aspleniums, &c., will come up freely in a week or two. In raising Ferns from spores under glass, great care must be taken as to the supply of water whilst they are in the Prothallium state; for if more is given than can be taken up by the soil and plants, it causes them to rot, and produce a fungoid growth which soon smothers everything; whilst, on the other hand, if kept too dry, the plants soon shrivel completely up. In sowing, fill the pots or pans three parts full of drainage, then place a layer of moss, and fill up with fine earth, pressing it down a little with the hand; then sow the seed on the top, but before sowing, give the earth a gentle watering. After sowing, place a bell glass over the pots (a flat piece of glass answers the purpose equally well) and keep them close till they begin to vegetate. A little air may then be given by tilting the glass. As they begin to root they require air; they must, however, always be kept tolerably damp. It is quite desirable that the soil should be baked before the spores are sown, as this destroys small worms, which are very troublesome when the plants begin to vegetate. This process will also destroy such seeds as may be in the earth, that would smother the young ferns as they came up, so that, by baking the soil before using it all such pests are got rid of. As soon as the plants are large enough to prick into pots or pans, that operation should be done, as they are apt to damp off if allowed to crowd or overgrow each other in the seed pot, and the oftener they are transplanted the better. When they begin to make strong fronds, pot them separately, always bearing in mind, on account of their tenderness, to keep them in a rather close atmosphere, and well shaded until they are established.

"Ferns are also propagated readily from the little bulbils which many of the species form on the upper side of the rachis, or from its apex, or on the segments. I allude to such as Woodwardia radicans and orientalis, Asplenium viviparum and bulbiferum, Adiantum caudatum and lunulatum, Hemionitis palmatum, Stenosemia aurita, &c. To cause these to root, the [illegible] which produce young ones from their points [illegible] them pegged into the soil, and not removed [illegible] parent plant until the young one has made [illegible] and roots. Those which form the young [illegible] on the fronds require the pinnæ to be taken from [illegible] pegged down on some soil, when [illegible] root and make good plants. [illegible] in a warm damp house, [illegible] parts, and soon [illegible] rooted, take them [illegible] I have seen the [illegible] of a vinery [illegible] seedling ferns; the [illegible] hang down [illegible] beautiful, especially hose of Adiantum capillus veneris, the true Maidenhair Fern, and the Scolopendrium vulgare."

The demand for Ferns is now very great, and find almost every Nurseryman devoting some space their culture, and, in some instances, indeed, maki them his principal study. Too much importan therefore, can hardly be attached to the foregoi observations, the result of hard practice, as to t best and most expeditious modes of increasing th numbers.

To the insects that injure Ferns a short chapter devoted. These chiefly consist of thrips, brow scale, and green fly. Of these, thrips are stated to the worst, and Mr Williams' mode of destroying it by fumigation with tobacco or well prepared tobac paper. Scale is also very difficult to eradicate, t best method of accomplishing which is careful was ing with a sponge and clean water. Old fronds i fested with scale may be removed; but not the who of them nor even the greater part of them at once, Mr Williams says he once killed a beautiful specim of Cheilanthes elegans (of which we give an illustr tion, fig. 2), by means of complete defoliation. Green and thrips, as has been stated, are destroyed mo effectually by smoking the house with tobacco, aft it is shut up in the evening. In addition to thes cockroaches are likewise very destructive to the you fronds. They must therefore be searched for by candl light and killed. Mr Williams sells a beetle pois which is found to thin their numbers, and trappi them with moss-filled flower pots is another mode getting rid of both them and woodlice. Pieces apple, potato, or turnip form attractions for slugs a snails, which also are pests that eat the small you leaves of ferns.

From the descriptive list of exotic Ferns we extra the following account of Adiantum excisum multifidu (fig. 3), a charming garden variety which made its a pearance in Mr Williams' establishment. Of this o author adds :—

"I may safely venture to say that this is o of the handsomest and most useful of its genu The fronds are quadripinnate; the pinnæ deeply c giving the plant a very graceful appearance; it grow from 12 to 18 inches in height, and in colour is ri dark green; stipes and rachis black. The apex every frond is frequently divided into several branch which oftentimes are again divided, thus forming beautiful tassel some two or three inches long, a featu which is well represented in the accompanying figu It partakes somewhat of the characters of A. cuneatu and A. concinnum, and will become one of the ve best for bouquets or Wardian cases."

One more extract, which must be our last, relat to the charming New Zealand Fern, Todea super (fig. 4).

"This exceedingly lovely plant," says Mr William "of which the annexed is an illustration, it is imposs ble to do justice to, either by words or even by t beautiful pencillings of a Fitch; it must be seen to appreciated and enjoyed. This is indeed a gem, beyond anything which this lovely tribe of plants h before yielded up to us, and, as it is quite at home a Fern case, no lover of Ferns should be without it, for nothing can excel the exquisite delicacy of its finely divided, undulating, and crispate fronds, which are of a vivid bright green colour, ovate-lanceolate in shape, and pendulous. A splendid plant for exhibition, and one which is always a great attraction."

The whole volume, which is at once descriptive and cultural, is written, as will be gleaned from the extracts which have been made, in a thoroughly practical style, and is illustrated by some prettily executed woodcuts. It contains chapters on Pot Cultivation, Soils, Tree Ferns, Filmy Ferns, Basket Ferns, Fern houses, Fern cases, Fern shades, &c., all replete with excellent information. In short, it is one of the most instructive works on Fern management with which we are acquainted.

Vegetable Teratology: An Account of the Principal Deviations from the usual Construction of Plants. By Dr MAXWELL T. MASTERS. Ray Society, 1869.

DR MASTERS is well known to be *facile princeps* in the knowledge of everything that relates to vegetable malformations, monstrosities, and abnormalities. He has now, for a good many years, reigned supreme in this department, and it is a great advantage both to the man himself and the branch of science he pursues, when this supremacy is early, fully, and generally acknowledged. Then every remarkable case finds its way into his hands. His friends and the public generally take a pleasure in observing and forwarding to him everything that they think will be of use to him. He observes with more zeal and interest himself, and is compelled as well as finds it easier, to keep himself *au courant du jour* with the scientific work of other countries. All these advantages Dr Masters has enjoyed, and his possession of them has brought with it another advantage. The Ray Society, recognising the extent and value of the information he possessed, and the importance of preventing its being lost, which has too often been the case from the premature extinction, by death, of similar store-houses of knowledge, has encouraged him to put it beyond the reach of casualty, by writing a monograph on the subject. This, he has done and the Society have published it; and we now reap the benefit of the fortunate concurrence of circumstances to which we have alluded.

To appreciate the full importance of this contribution to scientific literature, the reader must bear in mind that there is no work in existence on the subject in the English language. There are a great number of partial contributions to it in various languages, but we believe only one work which has taken up the elements of Teratology, by Moquin Tandon, in French, which contains a very small amount of material compared with that amassed by Dr Masters.

To the scientific reader we have only further to say that Dr Masters has performed his work in an admirable manner. It contains, we believe, a record, description, and figure of every kind of abnormality which has ever been observed, and an explanation of its meaning. If all his work continue to be as well done as the past, it will be no pun in future to describe good work as *masterly*.

To the non-scientific reader it may, perhaps, be necessary to say a word or two on the nature of the subject and its importance. He probably may be disposed to think it a matter of very little consequence what deviations occur in a plant. He may admit the merits of physiology as a science, and yet not see how a plant turning from a single into a double flower has anything to do with it, and yet it would scarcely be too much to say that our entire knowledge of the true relations of the parts of plants to each other is derived from this study and nothing else. Suppose, for example, that no abnormalities of form in plants ever occurred—that petals never changed into leaves, stamens into petals, or leaves into roots, that everything went on invariably in one order—how should we ever have divined that all the parts are interchangeable with each other—in other words, that the whole plant is a mere congeries of leaves which have undergone different kinds of modification. But by the light we have gathered from the variations which nature produces, we have traced the whole relations of the organism, and advanced in the path of physiology far beyond where we should otherwise have been. But there is much more yet to do, a wholly new phase remains for inquiry, on which, we believe, vegetable physiologists have not yet touched. Dr Masters has erected a solid outwork which will serve as a basis for himself and future workers from which to start. The physiologists of the animal kingdom have lately entered on the study of monstrosities from a new point of view. Not content with endeavouring to decipher and interpret the monstrosities which have come into their hands ready made, they have set to work to try to make them themselves, and, of course, if they can once ascertain the conditions which decide the appearance of monsters, they are a long distance on the way to ascertain the reason of their appearance. By taking the eggs of fowls and exposing them to heat in different positions (vertically, for example, instead of horizontally), and partially varnished, Geoffrey St Hilaire succeeded in obtaining monstrosities. And M. Dareste has lately extended his observations in the same direction, and, by concentrating a greater amount of heat on one point than another, has succeeded in disturbing the development, and producing abnormal forms. These disturbances, and the determination of the fate of the animal (monster or not) take place at a very early stage in the development of the egg, while its contents, in fact, are still homogeneous; but he thinks he has traced the connexion of certain conditions with certain forms of monstrosity. Be that as it may, the path, though arduous, is enticing; and by-and-by we cannot doubt that if any results flow from it in zoology, similar investigations and experiments will be directed to the development of the ovule in plants. Hard as the path may be in zoology, it will be greatly more so in botany, but we know no one so well qualified to carry it on, or bring it to a successful issue, as Dr Masters.

The Garden.

RAISING ONIONS.

THE reason why many do not succeed in their first attempt at raising onions, is because they do not select ground which has been suitably prepared in the cultivation of the two or three previous crops. It is a mistake that onions do better, year after year, on the same ground, simply because onions follow onions. It is the higher manuring, more thorough pulverization and mixture of the soil and manures, and the cleaner and more careful cultivation required every year for onions, than is given to any other crop, that fits ground better for them.

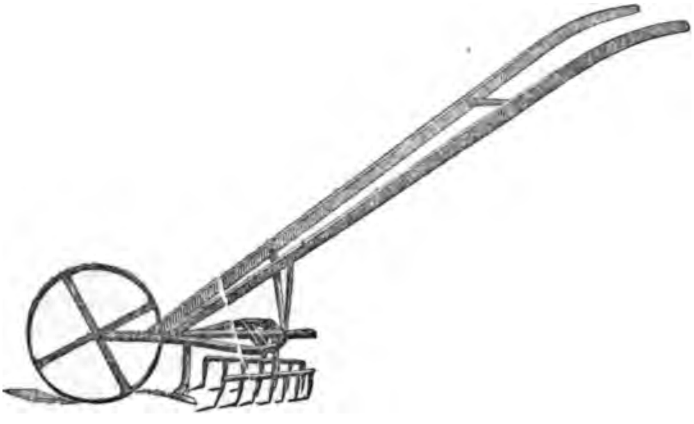
Onions will undoubtedly succeed better many years on the same ground than most other vegetables, but there is a limit to this success.

One great trouble among beginners on new ground is, that the onions will not bottom and ripen at the usual time, but continue to grow all the season, and produce too many "stiff necks" or scallions. There are several causes for this. One is, the land, which is too poor to commence the cultivation upon, is heavily manured and ploughed deep, bringing the poor subsoil to the surface. The seed in such soil comes up weak, if at all, and the onions grow very slowly until they get hold of the decomposed manure, when it is too late in the season for them to mature. Late sowing [illegible] seed [illegible] all [illegible] [illegible] ... [illegible] any [illegible] almost any [illegible] except stiff clay [illegible] gravel. It is essential, however, [illegible] the [illegible] and should have been made rich by the thorough incorporation of manures in clean tillage, for : least two years, from the sod. Barley an then potatoes, carrots, or beets, are goo preparatory crops. One or two heavil manured crops admirably fit the ground f onions; old vegetable gardens are perhap the best, except where cabbages have bee grown, which are the worst of all crops t precede onions. Heavy, or rather claye moist, not wet, loam generally produces th largest onions. If coarse manure is to b used, spread on twenty to thirty loads to th acre, say about the middle of November, an plough it in not very deep; or use one ton guano, spread on after ploughing, and harro it in. In the spring, as soon as the groun will work, plough four inches deep, and sprea on a good dressing of fine compost, or 3 cw Peruvian guano, or superphosphate of lim and harrow it in well; back harrow and harrow again, and if not smooth enough, dre with rakes. When not manured in th autumn, stable manure, free from grass an weed seeds, should be ploughed in in th spring, and the guano or other fertilizers harrowed in.

Every gardener should have a markin rake. They will save a great man steps in laying out; besides, the straight an uniform rows enable the men to accomplis a great deal more in cultivating and weedin with [illegible] new implements.

[illegible] construct a marking rake, make th [illegible] feet 10 inches long by 2 inches squar [illegible] four ¾-inch holes 14 inches apart, com mencing 2 inches from the ends; one hol [illegible] the centre; and holes at 12, 15, 16½, an 18 inches on each side of it. Make four teet 6 inches long, an inch thick, and round the at the points. Secure them with a pin o key at the tops, so they can be easil changed and adjusted to the different widths. The handle of the marker should be 6 feet long, split, and spread so as to form braces where it is fastened to the head.

The land being prepared for sowing, stick down the stake, run off the line, and lay it where it is desired to commence. Adjust the marking rake to 14 inches, draw the outside tooth carefully by the line, and follow back and forth in the last mark, until completed. After the ground is marked off, it should lie a little while for the surface to dry before commencing to sow the seed. It covers much better, and the dirt will not stick to the wheel of the seed sower. The best onion growers now do not use seed sowers with a roller attached. It packs the earth so hard that it bakes after a heavy rain, and very much impedes the growth of the young plant, and it is not so easy in weeding to break the crust formed where rolled down flat as when the seed is covered by rakes or a light drag. It is of the utmost importance to get good seed —not only good, strong-growing seed, but seed that has been raised from good-sized, well-ripened onions. Sow four to six pounds to the acre—say about three seeds to an inch, or five seeds to two inches; cover half an inch.



Comstock's Onion Weeder.

As soon as the onions are up so they can be seen the length of the rows, run Comstock's Onion Weeder, through them with the rakes adjusted so as not to throw the earth upon the young plants, and repea often enough to prevent the growth of weeds This will keep the ground perfectly clean between the rows. When they are just out o the double, or when the first weeds begin t shew, after cultivating, the ground should b raked lightly, *diagonally* across the rows wit a common wooden hay rake. This will brea the crust, destroy the weeds in the rows, an give the young plants a good start.

Early in June, when the onions are 4 or inches high, sow about three bushels to th acre of not very coarse salt, broadcast ove them. After the second weeding, spread o a good dressing of wood ashes. They requi three or four weedings in the rows; but pains were taken in marking to keep the row straight and uniform, the onion weeder wi run so close to them that there will be b few weeds to remove by hand.

When the tops have fallen and nearly drie down, draw four rows together with a woode rake, raking two rows at a time toward th other two rows. Drag forks are sometime used, but in careless hands they pierce a goo many onions. They may remain as rake together several days, or until sufficientl cured to strip. Cut the tops about an inc from the onions. If they are stripped whil the tops are partly green, they do not keep so well. After stripping, remove them to an outbuilding on a dry day, with a north-west wind, and spread over the floor, not more than a foot thick; turn them occasionally.

The best way to keep onions in quantity through the winter is, when perfectly dry, to spread them 18 inches thick on a tight floor in a barn or outbuilding. Leave a space of 2 feet next the walls of the building on all sides; spread a sheet entirely over them, fill the space with fine hay, and tread it firmly; then cover the whole about 2 feet thick with the same, and the onions will ordinarily keep well. They should never be disturbed if frozen, but as soon as the frost is completely out in the spring, take off the covering and spread them all over the room, opening the doors and windows to give air in pleasant weather. If the are not well covered, and the thermomet should fall below zero, some of them ma be frozen beyond recovery, and be soft whe thawed.

White onions are the worst to keep, o account of their gathering moisture so readil They should be kept spread quite thinly o a floor *in the light*, and where the air ca circulate freely. Just before winter sets in spread a few inches of straw on the floo and place the onions on it 4 or 5 inche thick; then cover them with straw, an let them remain undisturbed until spring or put them into crates, and cover wit hay in the barn, or pile the crates next th walls of a cool cellar. Onions are generall one of the most profitable crops, often yield ing 400 to 600, sometimes 800 bushels, t the acre.—*An Old Seed Grower.*

PLANT IMPROVEMENT.

THE following is an abstract from a long and important paper on this subject, read the other day at the Manchester Horticultural Congress, by Mr W. Paul, of the Nurseries, Waltham Cross:—

There are two important methods of procedure (says Mr Paul) open to him who may wish to engage in the modification or improvement of plants. 1. Selection; 2. Hybridising and Cross-Breeding.

First, of Selection:—It is well known that most plants, and especially cultivated plants, when raised from seed, are prone to vary [illegible] plants, and [illegible] tendency increases under cultivation, yet it appears in both states. Among wild plants I have met with no more striking example than that of the Lychnis diurna which grows plentifully in the hedge-row surrounding my nurseries at Waltham Cross The flowers of some of these self-grown plant are much larger than others, some are of a deeper colour, and some of a smoother aspec and more rounded form. The habit of growt of the different seedlings also varies greatly the dog rose (Rosa canina) is another case in point. Examples of this fact are, however plentiful enough in Nature, and might be adduced almost without limit if required. But it is only by selection and cultivation that the most attractive forms of these natural varia- can be fixed and turned to practical account. The advanced Lychnis, if neglected and allowed to seed in its native wilds, would probably produce offspring for the most part similar or inferior to itself, except rarely and at long intervals of time. If, however, removed to a superior soil, more highly nurtured, and the seeds gathered from the most attractive plants only, the improvement would

bly go on gradually but regularly from
ation to generation.

elucidate further the principle and
s of selection, let us suppose an in-
ent agriculturist observing in his wheat-
some individual plant of wheat,
vigorous in growth, or more prolific,
r, stouter, and fuller in the ear than
by which it is surrounded. He wishes
tain this variation, knowing that if he
ucceed in so doing he will thereby in-
e his crop. He sets a mark upon this
, saves and sows the seeds separately,
s again and again, from year to year,
most in advance, be they few or many,
the variation first noticed has become
ant and fixed, and perhaps even further
oped. This process of selection usually
es to be pursued through several genera-
some of the individuals from each succes-
owing continuing to advance on the line
ndicated, and the whole drawing closer
ner, till in the end he establishes the
or constancy of the race. Once estab-
l or fixed, the variation will remain an
ved race or breed, and if the individual
s composing it are not absolutely iden-
they are yet sufficiently so for practical
ses. In this instance we have supposed
e of selection for a prolific tendency, but
ame principle may be applied to any
desired improvement, as quality of
earliness or lateness of ripening, quan-
r quality of straw, and so on. Or, to
other instances from agriculture: the
r observes among his mangold wurtzel a
remarkable for the large size of the root
he small size of the top; among his
s a root that has stood the frost unin-
while others surrounding it have been
ially damaged. He selects the mangold
he view of increasing the weight of his
without drawing too much from his
the turnip for the sake of obtaining a
er race of this valuable root, and follows
e process of cultivation already de-
d until he fixes the recognised and
ed features.

with the agriculturist so with the
ner, whose superior vegetables are in great part due to the judicious selection of the individual plants from which he saves his seed. Perhaps half-a-dozen of the whitest and closest heads of white brocoli are selected off many acres as the source of the crop for the ensuing year; and other vegetables and flowers—as onions, cabbages, lettuces, stocks, &c., are subjected to the same careful process of selection.

To continue: our seed-growers work on the same principle, although in place of leaving a few only of the best, the quantity of seed they require compels them to rest satisfied with eradicating a few of the worst only, and the value of their crop of seeds is, or should be, in proportion to the thoroughness of the selection, or, as the growers term it, the purity of the stock. If in the Act to prevent adulteration of seeds, a clause could have been inserted ensuring the purity of the stock, I should have considered that by far the most important part of the measure.

I have intentionally given prominence to the above cases, because I believe the farmer, market gardener, and seed-grower, whatever attention they may be giving to cross-breeding now, have in the past derived their improvements chiefly, if not entirely, from selection; whereas, the horticulturist has been for many years past working more or less ardently in both fields. There has, however, I believe, even with him, till recently been but little hybridising or cross-breeding with vegetables; more, perhaps, and for a longer period, with fruits; and most of all, and for the longest period, with flowers.

The vegetables and flowers which I have improved by selection merely are somewhat numerous; among the former, parsley and Brussels sprouts.

Parsley was the first plant I endeavoured to improve by selecting for seed one or two individual plants from a large bed, the unusually double or curled leaves of the selected plants having pleased my fancy. The result was so striking in the following year that I was encouraged to persevere, and did so from year to year with increasing success, until "Paul's Parsley" became household words.

Brussels sprouts, the seed of which it was considered necessary in those days to import from the Continent, was the next plant taken in hand, and I proved, over a series of years, to my own satisfaction at least, that it was neither the Continental soil nor air, but the practice of a rigorous selection, that gave to the Continental seed an acknowleged superiority.

The aster was the next plant taken in hand, and with the same results. Stocks, pansies, roses, cinerarias, hollyhocks, zonal pelargoniums, Chinese primulas, and polyanthuses, were taken up in due succession, similarly dealt with, and similarly improved.

The hollyhock would seem to demand at my hands more than a passing word. To the improvement of the flowers of this plant by selection I gave long and close attention from the year 1853 to 1857. Let me submit to your notice some of the results of the sowing of seeds from selected plants without the interposition of artificial fertilisation. The variety Gloria mundi (yellow) gave Sulphurea perfecta, Argo, El Dorado, Queen of the Yellows, and King of the Yellows, all yellow flowers; and Charles Barron, buff. El Dorado, a smooth yellow flower, gave yellow flowers only, bright in colour, but rough and irregular in form. Lady Willoughby d'Eresby (cream colour) gave a lot of rough dirty whites. Lady Franklin (deep pink) reproduced itself, and also gave sundry good rose-coloured flowers. Lady Palmerston (blush) gave a very fine brood of peach-coloured and pink flowers. Purple Defiance (purple) gave a rough lot of purples. Attraction (pink) gave a fine brood of pinks. Princess Royal (cream and chocolate) gave a rough lot of dirty cream and chocolate-coloured flowers. Crusader (pink) reproduced itself, and also others of similar colour, varying in form. Celestial (blush) reproduced itself, and various shades of blush of superb quality. Memnon (a fine crimson flower) produced regularly some plants bearing crimson, and others bearing purple flowers. Omar Pacha (cream edged with white) reproduced itself. A purple seedling of good form and substance gave some purple and some blush-mottled flowers of very indifferent quality. A salmon coloured seedling of fine quality gave flowers of the same colour, but of indifferent form. A fine dark-shining crimson seedling gave flowers, orange, fawn, and buff, of middling quality, but no crimson. A white-edged seedling gave flowers like the parent, but as a rule not so good. A fine rosy peach-coloured seedling gave rubbish. A nankeen-coloured seedling reproduced itself almost without variation. A pure primrose seedling of very high quality gave some primrose-coloured flowers and some primrose with dark base, usually inferior to the parent. A French white-veined seedling gave a lot of prettily and variously veined flowers. An orange buff seedling gave also some few prettily veined flowers among many very rough ones, of the colour of the parent. A fine purple seedling gave purple, marble, maroon and lilac flowers, all of superior quality.

Now it might appear at first sight that the above results militate against the theory o improvement by selection merely. But it is not really so. It must be told that the above is a record of general results only. In most cases few or many individuals might have been selected in advance of the parent. Let it further be remembered that this is the result of one year's growing only, and i certainly proves that a variation canno always be fixed by a single plant, which we are perfectly free to admit. It shews also the tendency of the mass of seedling plant raised from cultivated or advanced varietie to revert to a less civilised state. It shew further, that a variation once obtained, new ground once broken, often proves a fertil source of further variation and advancement But of this I shall give an example by-and-by Now, I do not think that the variation i colour recorded in some of the above case was due to fertilisation either by insects o other instrumentality. But it might be so I merely express an opinion on this point founded on the fact that the progeny of some varieties varied but slightly throughout suc cessive annual sowings, whereas that of other varied greatly. The inference I should draw would be, that some variations are capable ore rapid development, some are more ve, and some more readily fixed than .

ill be further inferred from the above that the finest flowers do not always ce the finest progeny. And I have this circumstance corroborated in g with other plants. Certain individual urnish a fine brood; others, apparently y good sorts, an indifferent brood. imes a flower or fruit of indifferent y will produce a high-class progeny, . high-class flower or fruit an inferior y. The whole question is, I admit, with difficulties, and offers a fine field servation and experiments. The ex- ns to the rule, that the best flowers ed from the best parents, are numerous. thstanding, unless we possess special edge we cannot do better than work this rule, for, if we reject it, we have g so good to put in its place.

e word as to the special knowledge just d to. Now and then a variation, pe- ly fitted for the work of progress, will Many years ago, a pansy, named Victoria, raised by the late Mr Thomp- f Iver, proved of this character; and recently the roses Général Jacque- , Jules Margottin, and Victor Verdier, e taken as prominent instances. From in their day, and for a certain period, more good flowers were raised, than all others of the period put together. if one acquires this special knowledge, is sure ground to work on. But I know law by which this quality of a plant e determined in advance. In the pre- state of our knowledge I conceive that only be ascertained by observation and iment.

ave raised many thousands of seedling ocks, roses, zonal pelargoniums, and plants, simply on the principle of ing the seed from the most advanced and flowers, without any attempt at breeding. My success under this method ceeding has been greatest with holly- , as I could claim at one time (about the finest hollyhock of almost every colour as of my production. This I account for by the fact that the subject was a good one for experiment. Although a flower long known to us, it had not been long subjected to high cultivation, and was fully ripe for improvement. With the rose the case was somewhat different. It had been experimented on by clever and industrious men in France for a number of years, and, doubtless, I was here traversing ground which some of them had exhausted long before. However, success here has not been altogether denied me, and to which I shall have occasion to allude by-and-by. Of zonal pelargoniums, I was fortunate enough to become the possessor of a remnant of stock left by the late Mr Donald Beaton; and while many of the variations and improvements that have issued from my nurseries are the result of mere selection, others have been carefully and systematically bred. The polyanthus is a flower with which I am now carrying on experiments, with the view of rendering it more available in spring gardening. Four years ago I selected certain colours from a bed of mixed seedlings, with the view of saving the seeds of each separately, hoping in time to be able to reproduce each colour true from seed. The first sowing produced all colours from each variety, and while subsequent sowings have done the same, yet each successive sowing brings a larger proportion of the colour of the parent; and I do not doubt that ultimately each variety will become fixed, that is, will reproduce itself true in colour from the seed.

Thus far I have confined my remarks to the variation of plants from seed which appear to rise spontaneously, and are of everyday occurrence. But there are other variations occasionally taking place, which are known to cultivators under the name of "sports." Sports are variations from the leaf-bud rather than from seed, and I class them under "selection," because, in their case, man does not intentionally step in with the view of giving a turn to the workings of Nature. Cultivation may, and in many cases probably does, induce "sports," but cultivation is not deliberately pursued with that object. As an example of these, we may instance the well-known case of the nectarine, which was a sport from the peach; that is, a branch of a peach tree produced the smooth-skinned and otherwise different fruit known as the nectarine. My first efforts at improving the rose were made in 1843, and were induced by discovering a sport. I observed a branch and flower of the Bourbon rose Proserpine, then recently introduced, of extraordinary vigour; the flowers were larger and somewhat lighter in colour than in the original; the leaves were of a lighter green, more obtuse, and destitute of the customary red nerves and red colouring round their circumference. This, which I believe I am right in speaking of as a sport, was nevertheless not a very marked example of this tendency. It was cultivated separately and fixed, but did not depart sufficiently from the original to be thought worthy of a new name, and was consequently sold as a superior variety of the rose Proserpine. About the same time I observed a branch of the rose Du Roi, bearing pale flesh-coloured flowers. This branch was propagated, and the new colour fixed. When about to distribute this as a novelty, to my surprise I received it from France, under the name of Celina Dubos! Now, although I know nothing of the history of Celina Dubos as received from France, I yet know that it was identical with my sport, and I think it is reasonable to conclude that it originated in the same way. Also about the same time I observed a branch on the rose Dr Marx producing leaves finely striped with gold, and a branch of the Bourbon Queen with leaves beautifully variegated with white. Both of these sports were propagated and fixed. Of roses the [illegible] inclined to sport [illegible] gro[illegible] [illegible] other nearly [illegible] Mr Bosanquet a white rose [illegible] a branch bearing red flowers.

But the most notable recent case of the tendency is that of the new double crimson thorn; and this is remarkable in having be observed in two different places about tl same time. It should be told, however, th both these plants had been purchased fro the same stock. The particulars of one ca are as follows:—A tree of the double pir thorn had been planted in a garden son fifteen or sixteen years, when a branch w observed to have started away from the cent of the tree with unusual vigour. It flowere and lo! the flowers were crimson instead pink, presenting a marked contrast to tho on the lower part of the tree. The leave too, were of larger size, greater substanc and more deeply lobed. Young plants we propagated from this branch by budding an grafting, and the character was fixed.

A few words with regard to the fixing variations or sports here seem desirable. W have seen that variations or sports are, whe reproduced from seed, liable to vary great in character, with a general tendency to reve to the type. From the first sowing there wi probably be but few like the variation; b by successive repetitions of the process sowing and selecting, the variation is at lengt fixed. It is thus that many of our races annuals—as asters, stocks, Clarkias, cand tufts, tropæolums, and the like, not readil propagated otherwise than from seed, hav been obtained. But the process of fixin variations or sports from the leaf-bud is almos certain to proceed without interruption. Yo graft, bud, or make cuttings of the sporte branch or plant, and the plants so propagate remain unchanged.

I will now proceed to the second part o my subject, namely, the improvement o plants by hybridizing and cross-breeding. I hybridizing and cross-breeding we start wit a conception which we labour to convert int [illegible] For example, we find existing in tw [illegible] flowers or fruits certain high qualities size, colour, form, flavour, mien, &c., which we seek to combine in one and the same individual. We cross or hybridize these two plants, sow the seeds, and after few or many attempts, one out of many is likely to give the desired result. As a guide in hybridizing and crossing, it should have been that our best observers are of opinion ybrids and cross-breeds derive their nd habit in great part from the female, lours of the flower from the male, while nstitution may be acquired from either t.

hybridizing we understand the crossing different genera or species; by cross- ing, the intermixture of two different es of the same species. Practically ng, the work is the same. It would be place here to enter into a lengthened ption as to how far the different species ants may be hybridized. Doubtless are limits. I have tried, on various ons, and in various ways, to obtain a between the Pyrus spectabilis and the ia japonica, two different genera, but t success; and I announce this, be- to acknowledge a failure is sometimes ful to others as to record a success. e other hand, I have succeeded in hybrids between the moss rose (Rosa lia) and the alba rose, two different ; also between a hybrid China rose llica × R. indica) and Rosa multiflora. again, I have often tried in vain to crosses between certain varieties. So does not seem to be exactly a question n species and species, or between and variety, as these are at present d by botanists. I have found, how- a rule, that the more nearly allied the s the more certain is the cross. The ted and Noisette roses are found to eadily; but then, although these form e floricultural groups, they belong to e species, R. indica. But the hybrid n and moss roses also cross readily, re we have intermixed three different according to most botanists: R. R. gallica, and R. centifolia. The t and the most beautiful of all the roups of the rose—the hybrid per- -has a curious genealogy: R. gallica with R. indica produced hybrid the latter crossed with an autumn g variety of the R. damascena pro- ybrid perpetual.

rst attempt at crossing the rose was made in 1843. I crossed three flowers of the tea-scented rose known as Goubalt with the Bourbon rose Souchet, with the view of obtaining a dark-coloured tea-scented rose. Let me call these flowers C, D, and E. C produced a very large pod, which ripened perfectly, and gave ten large seeds. D produced a medium-sized pod with nine seeds of very unequal size, one being very large, four large, and four small. E produced a small pod, which contained thirteen small seeds. Of these thirty-two seeds, four only germinated! Three of the plants were curious cross-breeds, of no floral value, and having little in common with either parent; and one, in leaf, habit, and flower, was very similar to the wild dog rose! As the seeds were sown in pots, and placed under glass, I do not think any stray seed could have found place among them. I was here, no doubt, unfortunate in the choice of my parent or parents, and regard this issue as an instance of the well-known tendency which the offspring of some cultivated plants have of reverting to the normal form. The same year I crossed about forty other flowers, but the crop of seed was indifferent, and the result nothing worthy of record. This non-success led me to submit to microscopical examination the flowers of a number of varieties of the rose, with the view of ascertaining which were likely to prove the best seed-bearers. The result of that examination is given in the "Rose Garden," second edition, pp. 96, 97. The conclusions I drew were:—

1st. That certain varieties are sterile, and incapable of forming perfect seeds under any circumstances. Of these I found such kinds predominate as roll the petals inwards, the centre of the flower being quartered in the manner of a crown. In others, the pistils were weak or imperfect. 2d. That many kinds where the pistils are perfect, which in their natural state form seed-pods that wither before arriving at maturity, may be induced to perfect their seeds by artificial fertilization. This class of roses is the best for him who intends raising seedlings to choose his female parents from, because there is little here to interfere with, mar, or counteract his plans, Be it remarked, however, that there are certain kinds which must not be confounded with the above—kinds which, owing to the length of time the seed-vessels are in arriving at maturity, never perfect their seeds in this country. 3d. That those kinds which we find seeding abundantly in their natural state are self-fertilized, and that their abundant production of seed is due to this point mainly, the more perfect development of the organs of reproduction, especially the polleniferous parts of fructification.

Thus fortified, I selected some twenty sorts of roses, planted them in a separate corner of the nursery, and, in the month of June 1846, crossed nearly a thousand flowers. Success in seeding was complete. On the 30th of September of that year I gathered 223 well-ripened pods of seeds, some of them of extraordinary size. Two successive gatherings, of about 100 pods each, were made at intervals of about a month, the whole number of hybridized and crossed pods gathered and stored amounting to 444. The seed was sown the same winter, vegetated during the succeeding spring and summer, and the seedlings bloomed at intervals over the next six years—that is to say, some bloomed the first year, others were six years before blooming. The result of the hybridizing and cross-breeding was apparent in many cases, but not in all. Two of the most striking and complete I will describe.

I had long thought that a bright dark-coloured climbing rose was a desideratum, as at that time nearly all our climbing roses were white or yellow. To obtain this I hybridized the rose Athelin (hybrid Bourbon) with Russelliana (multiflora [illegible] Paul's Vivid, a brigh [illegible] [illegible] [illegible] [illegible] bourg with [illegible] alba [illegible] [illegible] offspring was a moss rose, with flowers [illegible] the Maiden's Blush, and afterwards named Princess Al[illegible]

A few years later I raised from one and the same sowing of English rose seed, the roses Beauty of Waltham, Lord Clyde, Red Rover, Globosa, Princess of Wales, Dr Lindley, and, I believe, Duke of Edinburgh. Unfortunately, in these cases the parentage of the offspring was not preserved.

The next flower with which I experimented was the hollyhock. I crossed numbers of these flowers in the years 1853-7. A blush seedling crossed with White Globe, with the view of obtaining better blush flowers, gave, among others, 10 seedlings answering to this end. Fireball Superb, crossed with Metropolitan, with the view of obtaining a better scarlet hollyhock, gave one plant of the character sought. A pink seedling crossed with Lizzie, with the view of combining the bright colour of the former with the quality of spike and flower of the latter, gave a large number of seedlings, 23 of which were realizations, more or less complete, of the object sought. These are three cases selected from many of similar import. With regard to the results in crossing the hollyhock, I may add that Mr Rooke of Clewer, at one time a most successfu raiser of seedlings, obtained three of his mos marked improvements, all differing in colour from one fertilized pod of seed, whereas, wit seedlings raised from seed pods not fertilized he found the degree of progress slow and uncertain.

Some of my latest efforts in hybridizing an cross-breeding have been directed to zona pelargoniums. Attempts to hybridize th zonal varieties with the unique have neve succeeded; and yet Mr Wills has obtaine hybrids between the zonal and ivy-leave species probably as distantly removed. H tells me that he hybridized some thousand of flowers without success, until he though dipping the hybridized flowers into wate for applying the pollen, by which means h obtained seeds and seedlings, two of whic evidently hybrids, are now before the hort [illegible] public under the names of Wills [illegible] Willsii rosea.

My experiments in cross-breeding have bee numerous, but having been pursued chief with my own unnamed seedlings, which ar

›wn, I have little that is tangible to before you. Two or three cases, how- in which the varieties were afterwards d and sold, may prove interesting, and a clue to those who may care to trace Mrs Pollock, crossed with a green- l seedling zonal, produced some green- l, some golden variegated tricolors, and olden-edged variety after the character of en Fleece. Amy Hogg, crossed with Cru- , gave the result sought after in Evening Governor, crossed with Alexandra, ;ave the result sought after in Clio. Dr , crossed with Rebecca, again gave the sought after in Pæan. Model, crossed Firefly, gave also a form intermediate en the parents, which was afterwards d Annibal.

My experience in selecting, hybridizing, and cross-breeding tells me that he who is seeking to improve any class of plants should watch narrowly, and seize with alacrity any deviation from the fixed character, and the wider the deviation the greater are the chances of an important issue. However unpromising in appearance at the outset, he knows not what issues may lie concealed in a variation, sport, hybrid, or cross-bred, or what the ground newly broken is capable of yielding under assiduous cultivation.

If we would succeed in this field we must observe, and think, and work. Observation and experiment are the only true sources of knowledge in nature, and while observing and experimenting, we should, above all things, guard against prejudices.

*THE MARKET GARDENS OF PARIS.**

has been frequently said that the minute division of property in land ls the improvement of agriculture in :e. It may be so with farming, but it nly does not hold good with market ns. Those in and around Paris are small, but they are the best and most ughly cultivated patches of ground I ever seen. Every span of the earth is ork; and cleanliness, rapid rotation, culture, abundant food and water to the —in a word, every virtue of good culti- 1—are there to be seen. I doubt very if such good results could be obtained larger system, and certainly in no part itain is the ground, whether garden or so thoroughly cultivated, or rendered r as productive, as in these little family ns, as they may be called, for they are ly no larger than admits of the owner's eeing the condition of every crop in the n at once. The Paris market gardeners as a class keep to themselves, marry among themselves, and seem content with about as much ground as gives occupation to their family. They are as a rule a prosperous class. The gardens vary in size from one to two, and occasionally three acres, are usually walled in and furnished with a cottage, a few sheds, and a well.

In the neighbourhood of our English cities the price of ground is high—according to our scale, that around Paris is very high indeed. From information gathered on the spot, during September last, I may say the rent varies from £24 to £33 per acre. On entering a market garden the tenant has to pay, in addition to his rent, from £200 to £600 for stock, fixtures, &c. It is necessary to dig deep to get a return under these conditions!

Manure forms a very considerable item in the expenses of these gardens. One market gardener of the first class paid 500 fr. (£20) a month for manure. His garden was about three English acres in extent, which is much beyond the average size. Manure would appear to be dearer than in London, from

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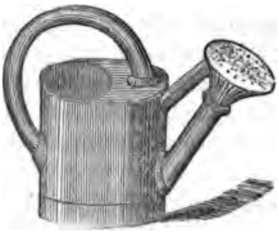
ım Mr Robinson's new work, noticed in this Maga- page 247, intitled "The Parks, Promenades, and ns of Paris."

three to four francs per horse being paid for it. Five francs a month are paid for that of each omnibus horse. These being in Paris all strong, large, well-nurtured stallions, their manure is the more valuable. It is usually piled in heaps near the entrance to the market gardens. Some of the crops are absolutely growing in nothing but decomposed manure; and it is used profusely for everything. From the beginning of May to the end of November the market gardeners have no use for hotbeds, and yet every day there arrives one or more loads of stable manure, all of which is piled into rick-like heaps, to be used chiefly in winter and spring. In November they commence to make the hotbeds, and as hot dung arrives every day they mix with it that which has been gathered during the summer—thus insuring beds giving a moderate degree of heat.

But a more important and expensive item is the watering. The Parisian market gardener, if not a scientific man, would appear to be fully aware of the fact that by far the most important constituent of vegetables is water. As a rule, the less of this they contain the worse they are. It is owing to the abundant watering of the market gardens, more especially than to anything else, that the Paris markets are in all sorts of seasons and summers better supplied with crisp, fresh, and delicious vegetables than those of any other city in Europe. Every market gar- [illegible] worked by the horse of the establishment, the Naudin system being generally preferred. From this the water is conducted into old barrels nearly plunged to their rims in the grounds at regular intervals over the garden, and from these barrels distributed by watering pots. These are always of copper—the best I saw being flat-sid and oblong instead of round-bodied. T hand springs clean from the top to the ba of the vessel, so that when filled and carri by the workman to the spot he wishes water, he merely has to pitch the pots (always uses two at a time) forward a lit and let his hands fall back, so as to hold t pot in the position which most favours t pouring out of the water. The pipe bei very wide, and the rose broad and fre perforated with large holes, the water is d charged almost in an instant, and the wor man again proceeds to his barrel close hand, and always kept filled from the pum Thorough watering is thus effected, but it i volves a considerable expenditure for labo one or two men being nearly always employ at it in each little garden during the sum months.



Watering-pot used by the market gardeners of Paris.

The system of watering with the hos generally adopted in the city of Paris, coul not fail to attract the attention of the mark gardeners: it is already used by several them, the old system of pots and tubs bein done away with. In these cases the pum is again employed to elevate the water to cistern placed a few yards above the highe point of the garden, and near the manur heaps and sheds of the establishment. examined a garden thus arranged, and foun the system very satisfactory. Twenty-seve outlets for the water were established ov the surface of a garden about two acres i extent. To these a hose of india-rubber i attached, with a few feet of copper tubin and a large profusely perforated copper di tributor or rose at its other end. From thi when the water is put on, it flows in a gentl but dense shower; and the apparatus ma be managed by a woman or a boy. Th hose is not on little wheels as is the one use in the roads and parks, nor can it be by an means or in any shape dragged over th growing crops that occupy every inch of th ground except the very narrow alleys betwee the squares or large beds; therefore there i a little contrivance to facilitate its use wit out injuring any of the plants. The outle we will say, is on the alley crossing th

, and the operator wishes his hose to ay thirty feet from the outlet, and up the narrow footways that leads from y. Three little wooden rollers held to- on one piece of iron enable him to do he following simple diagram will explain . There is a little wooden roller on ss bar, and one short one with a mar- each of the upper limbs—the lower form the teeth, and are stuck in the Through this, placed at the mouth alley, the india-rubber hose glides as s a snake, without hurting a leaf. The nical arrangement of each outlet is such twist of the base of the hose which fits ade to turn the water off or on in an . This very satisfactory apparatus ts owner about 3000 francs. Having n pump, there is nothing to pay for ter.

ody could pass suddenly, as I have from our own markets and market s to those of Paris in the middle of t a wet summer without being forcibly how advantageous it would be to be command water in our gardens. It custom, and a very frequent one, among orticultural community, to grumble our climate—the "dull," "cloudy," geable" climate of Britain; to speak of other countries as paradisaical, and ibute all our failures to "want of sun." 868 we had sun enough to satisfy an and what was the result? The worst emembered in the garden. It was to think the soft, green vegetables suffer, but everybody hoped the heat prove favourable to such useful mem- f the Solanum families as the potato mato; whereas the potatoes proved than if badly blighted, and even the ving tomato dropped its flowers before . Radishes disappeared with the dew . The cabbage tribe presented, every- that they had not completely perished, spectacle—a mere bony framework of s vegetation, with all the softer parts l away by hungry tribes of vermin, the ings that flourished with the heat. In ndition the Brassica were sold, and —the fact speaks well for the appetite of the public—eaten. An extensive London market gardener shewed me a field of celery with not a single plant in it good or large enough to be culled for seasoning, and at nearly every root grubs gnawing away the plant. Those who are accustomed to realize hundreds of pounds for a crop, gathered barely as much of it as would make it worth while sending to the market; while the private growers were quite as badly off. During the month of July, and when cauliflowers in British gardens had almost disappeared, I measured them in the market gardens of Paris a foot in diameter, of that pure creamy white and perfectly dense and firm texture which admirers of the cauliflower like so much. Strange as it may appear to some, during the whole of the hot weather vegetables of the primest and the most delicate quality were to be had in the Paris markets, where even greater difficulties had to be met by the cultivator.

Be it observed that this is no contrast of 1868: it is the same thing, to some extent, every year. The year 1867, for example, was anything but a dry one; yet, in passing through the central markets at Paris during the month of July, 1867, with an excellent cultivator who has every convenience and good ground in the prettiest and richest part of Surrey, he was more surprised with the radishes and young turnips than with anything else. "We cannot get anything like these at this season," said he. Of course not, and simply because we do not take the simplest precautions to secure them. We have them when the weather is dewy and favourable, and where the climate and soil are moist; but a few weeks of dryness puts an end to all such luxuries, and should the drought continue, everything becomes worthless and uneatable, as during the past season. But are we in a position to boast of our horticulture while this is the case? Does the routine work, which merely waits upon the seasons thus, deserve the name of skill? I think not, and moreover that it is absurdly unsatisfactory to reflect that the very things which our watery and cloudy clime is supposed to be most favourable to, are to be found in greatest perfection with the French, in the drier and, for vegetables, less favourable climate of Paris! The secret of it all is that the French market gardener, in addition to tilling and enriching his ground in the best manner, waters thoroughly and repeatedly every crop that requires water for its perfect development.

Our gardens are no more prepared to encounter a great, or even an unusual scarcity of water, than they are to meet a second deluge. The practice of dragging water considerable distances in pots and barrels is a very doubtful good; watering is useless if not thoroughly done. I need not remind the reader of the many things to which water is almost the life. Extract the water from a juicy lettuce, or any other appreciated vegetable, and how much remains? Our soils are of course saturated with water in winter, when plants do not want it; but it is often absent when they would absorb it as thirstily as the hart the cooling stream, and when the absence of it leaves them mere accumulations of tough fibre. I am not sanguine enough to hope that any words of mine can induce cultivators to adopt something like a system for watering gardens effectively; but ther can be no doubt whatever that it would be decided advantage to establish immediatel in every large kitchen garden a small department near the best supply of water, to mak it rich and light, and keep it thoroughl moist during the dry and warm months; s that a few crisp and delicate salads and vegetables may not during a dry season be as impossible with us as upon the Sahara. This small division might be established in most places without any but the most trifling cost, and the result would be very satisfactory indeed. Even a few very rich and light beds, closely cropped and looked after, and placed near a good supply of water, would repay the cultivator, and perhaps soon lead him to adopt the same plan of giving abundance of food and water on a larger scale. It need hardly be added that it would not be necessary to make any such arrangement in any very moist districts in the British Isles; but although theoretically our climate is very moist, there are many parts of the southern and midland counties where a modification of the Parisian plan would prove a decided advantage.

PATENT FRUITS AND VEGETABLES.

A PETITION to the American Congress, emanating from a committee, on behalf of the Grape Growers' Association, dating in December last, praying for a "Horticultural Protect[illegible] Rights Bill," has but lately come to ou[illegible]ice. The purpose in other words [illegible] make i[illegible] the Patent Offic[illegible] department [illegible] paten[illegible] [illegible] speculat[illegible] [illegible] but differ very widely from th[illegible]sitions assumed in this paper. We fear that honest and worthy patentees under such a law would be no more sur of reward than they now are, and that a the same time the public would be muc more open to imposition and quackery. Th difficulty every agricultural writer now meets in combating the enormous pretensions o those who have new sorts to introduce, whe[illegible] [illegible]hey are evidently exaggerated or unfounded [illegible]fficiently great, without entrenching them [illegible] the protection and enhancing their claim [illegible] the prestige of a patent—which, to th [illegible] would be nothing less (howeve [illegible]reasonably) than a government endorse ment of novelty and merit. Those who hav more time and wit and taste for peddlin rights and making bargains, than for hones and industrious efforts after excellence, woul have a rare time, indeed; the retiring and modest, in the majority of cases, being even more than in the power of speculators, from the greater inducement offered to prey upon the results of their work.

This is supposing the success of such a measure. But there is another possibility in the case, which is, that while the unwary and ignorant, who "do not read the papers," would still be in the power of swindling pretenders, patents would prove so odious and irksome to the better advised portion of the public—the very ones from whom must come all support for what is really valuable—that by common consent any patented fruit or vegetable would be pretty much and pretty severely let alone.

Who, for instance, wants to covenant, in buying strawberry plants, that for every one he may give to a friend, he shall render an account, even if it be for only a farthing? that every scion of a pear or apple he may exchange with a neighbour must be accompanied with a warranty deed of the right to engraft it? It is a "vital point," as the petition says, that such a law should cover just such trifles as these—or it is nothing—and this is certainly a curious argument in its favour. *De minimis non curat lex.*

There is much that might be added against such an enactment if there was any real prospect of its success. The petition before us is less consistent with itself than might be wished. The prospect of profit *has led*, we are told, to the progress which our horticulture has seen without patent rights or legal protection; *hence* progress must cease if that protection is not now accorded. In point of fact, there never was a time when the rush for novelties offered so great inducement to the propagation of new sorts as now; the additional inducement of patents we fully believe would be in the main illusory and impracticable, and, in the benefits they might confer, are exceeded by the evils of which they would be the pretext and occasion.

The Stable.

THE ANTIQUITY OF HORSE-SHOEING.

BY JOSEPH GAMGEE, SEN.

[Continued from page 274.]

T has been stated that there is nothing known by which the commencement of practice of horse-shoeing can be fixed on, n approximately, with regard to country epoch.

All that has been advanced on the matter ts on nothing more substantial than con- ture; therefore, it is well that some of the arguments in favour of the late adoption the art should be reconsidered, for, not- hstanding the proofs we have that horses e used several thousand years before we e any detailed account of shoeing, it is tended that shoeing was not known, or historians of the times would have trans- ted to our generation notice of the fact. d yet, it seems to me, that the reasons uced to prove that horse-shoeing is of an no more remote than from the fourth to eleventh centuries, between which, most ters contend, it was inaugurated, viz., the ence of records on the matter, tell diame- ally the opposite way.

contend, on the contrary, that an art of n importance to the world as that of horse- eing, could not have been first adopted the Christian era without producing the lence and leading to its proclamation, n the mighty forces, which were only nt, burst forth. The art of shoeing was in in the dark ages, and we have the un- bted proofs of the fact, as I shall hereafter v. Nothing, in my opinion (and all in- nces on the matter have nothing but opi- ns to sustain them), but extreme antiquity he art of horse-shoeing hides its origin n our knowledge.

he solution of the question of relative quity has been sought in the writings of the Greek sages, from those of Homer downwards. But silence on the matter is urged as proof that horses were not shod, and where one translator makes Homer mention a horse-shoe, another declares that the word means no such thing. Again, where all agree that Homer speaks of a "brazen-footed horse," the objectors to the antiquity of the art exclaim, that no such thing as a horse's hoof armed with bronze, brass, or other metal, was meant, but that the sentence was metaphorical. Yes; but it might have been, and no doubt was, philosophical. Then, as regards Xenophon's work, "De re Equestri," the greatest that has come down to us from the Pagan ages, I have come to reflect on that work, in my years of experience, as a treatise altered and mistranslated in at least one of its most important parts as regards the question of shoeing. The passage in Xenophon's work to which I have latterly come to object, as not conveying his words, it being incompatible with the rest, is the following:—"In order that the *stable-yard* may best answer the purposes of hardening and strengthening the horse's feet, let four or five loads of round stones, of about a pound weight, be thrown down in it, having a ridge or border of iron, that they may be kept together, and not scattered and lost. The horse being obliged to stand upon these stones, will procure the same advantage to his hoofs as he would if he went upon stony roads every day." This passage, as it has been commonly explained, and as I used to read it, is calculated to impress the mind with a procedure such as that of taking the prescribed quantity of shingle from the bed of a torrent, hemming it into a heap as

and in a clean, dry, and loose state,
horses to stand on it. But, apply the
ractice with unshod horses, and what
en? We will, moreover, suppose the
e done in an eastern climate, such
Greece. In the first place, a heap
, four loads, with a column in the
horses to be tied to, would be re-
f a diameter of from 12 to 14 feet,
ncircling iron of from 30 to 44 feet
. Now comes the placing of the
stand while being cleaned or other-
one or two hours—what will become
loose stones? Why, from the first
utting this process to the test, the
ll become intermixed with filth, solid
d, and in a few days, if the practice
tinued, the whole would become a
offensive substance, of which dry
uld form the least part; it would be
flies and insects, and the source of
effluvia incompatible with either the
r health of horses. Therefore, since
uch in the work attributed to Xeno-
lmirable and instructive, evidently
of experienced knowledge, it is not
t that he bequeathed anything to
of which he had not made trial and
od. And on those grounds, I for
tever scholars say to the contrary,
believe that the above quoted para-
ther verbally or in sense, was ever
by the philosopher to whom it is
l.

is wrong, why not the whole para-
And why, if a border of iron around
re, or thing, that thing should not
en the horse's hoof? which would
small web of only 14 inches in
nstead of a large one of 44 feet
ound the stones. I have no
rses were shod long before Xeno-
ime, and so thought Bourgelat,
essed the same; he reasoning not
m historical data, but from profes-
owledge additionally. It is argued,
is the soundest ground taken up,
of the antient sculptors have repre-
orses with shoes on. Though it is
Bourgelat affirms it, that the antiquarian, Fabretti, had found one equestrian monument on which the horse was represented with four shoes on. If that be correct, more monuments need not be sought for, one being as good as a hundred.

Then, in reference to a later period, we are told of Pliny and Sueton, who mention that Nero's mules were shod with silver, and that Poppee's mare's shoes were made of gold. These stories are objected to as fabulous, and of no weight in determining the question, and so we go on objecting to all the incidents which together amount to proof, and keep on looking for some treatise, or work of art, such as is never likely to be found, on shoeing. The very mention of silver and gold shoes would seem to shew that in the time of the antient Romans there were horse and mule shoes made of commoner metal. Words are usually applied to things, and when the first are heard, or seen written, the phenomena indicated are looked for. But here, again, practical knowledge comes to bear. There is usually some foundation for sentences gravely written and preserved. Could there have been any use in gold and silver horseshoes, above iron shoes, apart from splendour? Yes, there could. Now, in order to reduce this proposition to intelligibility, let us first take the account of the Roman Emperor's retinue, said to have been composed of hundreds of carriages and several thousands of mules; and suppose that to have been the array for all his attendants and guard, it may be assumed that the mention of shoes made of the precious metals had no reference to the whole, but to the choice animals or set of them, used by the Emperor personally, and so with those of his Empress.

A technical question arises here intimately connected with the whole subject of shoeing horses in southern cities, and with the subject of shoeing in general. The hard stones, such as Rome, Naples, antient Pompeii, and some other cities are paved with, are so slippery that they are dangerous to ride over with horses shod with crude hard iron, and many alternatives have been had recourse to, notably that of using horses barefooted; but while that answers in dry weather, within the limits of the pavement, foot-hold is less secure in wet weather without than with metal shoes. With that knowledge, I made some independent trials, thirty years ago, while in practice at Florence, starting with the well-known fact, that with shoes made of iron of fine grain and texture, such as that produced from the Isle of Elba mines, and made of charcoal, horses did not slip as when shod with harder iron. Therefore, I tried other metals, beginning with lead, and found that ample and almost uniform cohesion with the hard stone was secured, both in dry and wet weather; but, as was anticipated, that metal neither kept the form given, lasted, nor protected the foot. But, as an experiment, it answered my purpose, and I then made four shoes of copper, for a horse, of the same form and substance as if I had used iron, and these were applied with complete success; and I occasionally had recourse to copper shoes, with the same object, afterwards. Now, let us estimate the probable truth of the application of the shoes made of the precious metals by the luxurious Roman Emperor. I have no doubt that either silver or gold would attain the object, that of defending the foot and giving foot hold, as well as copper; and if that occurred to the Emperor or his advisers, these precious metals would surely be used, and with less actual extravagance than the copper in my own case.

In conclusion, I do not believe that horseshoeing was of European origin, or, that its inauguration belongs to the Christian era; and the grounds of my views are—firstly, the universal adoption of the art, localities excepted, when we first come upon any trace of it; and, secondly, from the admirably detailed de[illegible] and instructions [illegible] the Italian[illegible] [illegible] [illegible] shod before the [illegible] [illegible] come, the eleventh century [illegible] something about the state of the art in all recorded times, as i was found from the north-western shores o Africa, throughout Egypt and Arabia. Wa that a European innovation, pushed bac over the old world, amidst strange tongues like the reversal of the flow of some might river? Then, if the art never went fro the West, it must have come from th East, and so no doubt it did. The tw European peninsulas—Italy and Spain—formed the most accessible inroads, and a different periods, also other points and citie on the Mediterranean shores.

In Beranger's "History of Horsemanship' is annexed a dissertation, by Thomas Pawnall on the antient chariot; the exercise of i in the race; and the application of it to rea service in war. "As this British island was in the very early ages of antiquity, and prio to the siege of Troy, planted by colonie from the great commercial nations in th eastern parts of the Mediterranean Sea, s the learning and arts of those polished peopl flourished in this land. The astonishing monuments of the Druids, who were th priests of those colonies, are proof of knowledge in mechanics, which we of this enlightened day only wonder at, but are at a loss t account for. The use of chariots, practised only by the Asiatics and Lybians, was th peculiar art of war in which the Britis excelled, and was peculiar to them.

"Although these colonies, and, indeed, al most the remembrance of them, had been, i the time of Julius Cæsar, overwhelmed by th barbarism of the natives, and of other uncult vated people, who had transmigrated fro the continent of Europe, yet this peculi Asiatic art of war, the same as that used [illegible] [illegible] of Troy, continued to be used eve [illegible] the time of his invasion by the th [illegible]tants; in this *manège* we find they e[illegible] to a very high degree of perfection."

The foregoing shews that the antie[illegible] were not, probably, without seeing t [illegible] of shoeing horses, nor destitu [illegible] ingenuity for carrying out the work.

In this endeavour to dispel errors as t [illegible]essary preliminary to the establishment scientific knowledge, I have profited by

ilable means. From the director of
ish Museum, and the custodians of the
ns of art bearing on the subject, I
en favoured with every necessary fa-
These specimens consist of several
es, one of which was found in France,
in Italy or Switzerland. They are so
ith a solid bottom, that the foot stood
rather in the shoe, which is raised
l and toe, and has two long
lips, one on each side, which, when
down to the hoof, give lateral support,
oth extremities, turned up before and
back of the pastern, terminate in a
rough which some kind of band might
go round the limb and fasten.

of these appliances, which appears
have had its use assigned to it, I
o have been adapted to one of the
f an ox—its fellow is wanting. This
terially helps to the solution of the
n of the use of these appendages; so
ated in their construction, so encumber-
cure, and chafing to wear, which could
ny time have been in ordinary use, must
ent to observers practically or theoreti-
nversant of the subject. These could
ve been used for emergencies, when
fs became worn, and the horse or ox
l, and when the custom of shoes was
neral than in later times. A given
of work of a kind, and in favour-
alities, could be borne without shoes.
compensating foot irons can only,
stimation, be regarded in the same
the modern horse sandals, made
em, and which have been patented,
sometimes carried attached to the
to be applied if the horse loses a shoe.
ch was their use, I infer from the fact,
ugh all these specimens have been
one of them shew any evidence of wear, not even so much as would be caused by the animals going a few miles on a road, or working three days on soft ground. No fast action, such as their use for war or the chase called forth, could be done by horses with their feet so embarrassed.

Regarding the casts, in the Museum, of the chariot horses, about which much discussion has taken place, owing to there being some indistinct appearance of bandages represented on the fore legs, I can infer nothing relevant on the question of antiquity of shoeing. There does not appear to be anything on the feet, nor anything on the hind legs; and as for shoeing horses for the displays in the Hippodrome, that was not only unnecessary in such a climate as Greece, and with such horses as were in use, but the best of shoeing would have been only an encumbrance. If there were some bindings round the horse's fore legs, as is not very clear, and yet some hypothesis must be advanced, I should say that these must have been for the purpose of ornament. Among the Roman antiquities, the equestrian statue of Caligula requires to be noticed. The figure of the horse, of small size, a pony, and the execution a splendid work of art, is, from a model of exceptional proportions, without shoes, and with feet the most perfect. That work suggests nothing new on shoeing to one who has constantly seen horses of the same country, used in like manner, with feet in similar condition. More instructive is the statue of St George slaying the dragon, placed in the South Kensington Museum, executed at Prague, and bearing date 1378. The horse in this work is represented shod; and the shoeing represented is a specimen of admirable workmanship, which would do credit to German science and art of horse-shoeing of the present day.

HINTS ON HORSE-BREEDING.*

By Mr J. PALLIN.

THE subject which I bring before you—namely, "Hints on Horse-Breeding," is one of considerable importance to every farming community, and I fear beyond the reach of my feeble pen; but my object is to give the result of some years' practical experience amongst horse-breeding, and give you a few hints which have come under my notice during the time. I do not intend, under the circumstances, to introduce to you the breeding of race-horses, but merely to confine myself to those breeds which, as a farming society, we are interested in the consideration of. The first object of every horse-breeder should be profit, with the view of producing a saleable, marketable article, exactly the same as you do your crops. To do so requires a fair knowledge of the subject, and a sufficient amount of care, patience, and intelligence. We have *two kinds of breeders*—namely, those who breed by chance and those who go systematically about it. Of the former we have the most frequent instances. A gentleman or farmer happens to have a mare which has carried him safely and comfortably for years on the road or in the hunting field, or has been his trusty slave in harness; and for either a kindness for past services, or some other cause, he wishes to have a foal from his favourite, feeling quite happy to have so good an animal to breed from. No further consideration is bestowed; her shape, temper, constitution, and action may be all good for a hunter or roadster; still she may not be suited at all for a brood mare.

Again, a person may have a mare which he intends to make a brood mare, which has not any of the qualities possessed by the other. She may be old, badly shaped, bad tempered, broken down, or of a washy constitution, blind, spavined, or curdy hocked; still she is used as a brood mare simply because she is on the farm. Now, can anything be more foolish than to expect success in breeding in such a way? And as it is by [illegible] most common practice, can it be wondered [illegible] farmers complain th[illegible] [illegible] breeding [illegible] disappointment [illegible] accrue [illegible] resembles her [illegible]

and form, but superior in breeding? If he did, ha
the evils might be avoided; but chance is agai
trusted to, and all the anxiety he evinces in the matte
is the cost of the horse's services; while, in othe
cases, it is the one which passes the gate, or is clos
at hand, or perhaps the property of a neighbour c
a friend, who is glad to give the service for other com
pliments. He may have every defect to which hors
flesh is liable; but this is no matter to the chanc
breeder: a foal is all he seems to desire. He neve
pictures to himself the cost of rearing it up to three c
four years old, and bringing it to a fair, when, if he
sold, and comes under the eye of a veterinary surgeon
he has the unpleasant task of informing him that hi
animal is a roarer, or has a pair of diseased hocks; h
is taken home, sold for a trifle, or put to work on hi
master's farm, which, in a short time, reduces him, b
more fully developing the diseases, to a cripple, an
he drags out his weary existence in misery. Th
systematic breeder never allows any chance work t
creep into his concerns. Whether he breeds racers
hunters, carriage, saddle, or cart horses, he select
with deep anxiety his breeding mares, and thos
which he can trace back to blood of unquestionabl
family in their class. They select the best sires, an
scrutinise their performance, pedigree, and shapes
and, in all probability, breed from those whic
have been already tried and found to produc
animals of the right stamp. Any defects i
his mares he endeavours to correct in his foals by hav
ing the sire super-excellent in those points, so tha
by close attention to those matters, he can almo
calculate with certainty what sort of animal he wi
have to dispose of at a certain age, the market f
him, and what in all probability he will be wort
Breeders of this description are yet not numero
in those counties. There is, however, nothing to pr
vent them becoming so; and they will generally su
[illegible] by confining themselves to breeding the o
[illegible] horses. I will boldly assert that horse-bree
[illegible] the Irish tenant farmer who breeds sy
[illegible], and knows its management. We kno
[illegible] difficult it is to succeed in any undertaking wh
[illegible] do not understand it; and the same difficulty exis
[illegible] horse-breeding. The demand for some years h
[illegible] increased, from the fact of foreign deale
[illegible] a large number of our best colts and fillie
The fame of our Irish horses has extended far an
[illegible]; and the more distant we go away from hom
the more are prized our "Irish nags." I can on
account for it in the fact that they must have th
great recommendation, which is an inheritance,

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* [illegible] Farmers' Club.

Irishmen, but Irish horses—namely, pluck,
and hardihood. The French and Austrian
are now carried by Irish horses ; and if it
t that some striking peculiarity existed, they
rtainly find remounts in their own country.

EE-FOURTHS DEPENDS ON THE MARE IN BREEDING.

lecting the second part of my subject, I take
, as on her, I consider, depends three-fourths
mportance in, I may say, any breeding, but
y in horses. I have scarcely ever seen a bad
any class out of a good mare ; and there is
an instance of extraordinary horses but the
g point of excellence could be traced in some
he dam. At the same time, we must not over-
e consideration of the stallion's properties. In
I could give you several instances where the
re, with different sires, produced almost every
orse of character, such as the dam of Stock-
hich has been justly styled the Emperor of
s, from the number of winners he has produced.
ntas, his dam, almost to her last foal, inherited
that peculiar gift of speed which makes a race-
and at present there are no less than six of her
the stud, and each of these has, to a greater
extent, the same peculiar power. Rataplan,
h an own brother to Stockwell, and said to
en a gamer race-horse, has not been so success-
t still was above the average, with several
the stud—good horses, from their power and
ss—one, I may add, in this county, which will, I
ident, be of service to the country in getting good
d stock. Amongst our home-blood we have
t Birdcatcher, whose dam, old Guiccioli, with
any sire, produced running horses, she being
e dam of Faugh-a-ballagh, which went to
and whose progeny are now the cream of the
studs. I only bring forward these few instances
rate the fact I have found must be first looked
nely, the dams. In breeding hunters, carriage,
horses, you will find it equally marked, and at
I know of a farmer who has a mare up to last
ich produced nine or ten foals, and he never
than from £70 to £100 for them at four years
while every year she got different horses.
r, power, endurance, spirit, I think, generally
the dam ; form, action, &c., the sire. In
g your mares, the following particulars should
uired into :—True blood, soundness, shape,
age, height, and temper. As I do not intend
cularise any class of horse, the remarks I offer
licable to all. Of course, each has its peculiari-
For instance, a thorough-bred shoulder is a bad
put to a collar ; and thorough-bred action
not answer in a four-horse plough. General
can only give you, and you can apply them to
ses of horses. It is not my intention to enter
e due observance of the crossing of different
culiar strains of blood to produce a first-class racer ; nor shall I dwell on the breeding of thoroughbred stock. The horses bred by us are of a lower class, and to those I will direct your attention. The pedigree of a hunter does not require that nicety of selection as in blood stock ; still, I consider it almost indispensable to have at least a couple of crosses of the thoroughbred. There are certain breeds which are peculiar for the natural qualities of jumping, and mares from such strains should have a preference. Wexford has long been famous for its hunters, and I think it has been due principally to that famous sire Elvas, who I may say stocked the country with his progeny for many years. They were all peculiarly made, long, low, strong horses, with shapes eminently suited for the hunting field, besides being natural fencers. Some of the sons and daughters of the famous Irish Birdcatcher have given us splendid natural hunters. In Carlow we had two of his sons—The Trapper and The Bird—which have produced nice stock ; while in Kilkenny, Doctor O'Toole has not disgraced his sire's name. In Kilkenny and Tipperary, the Welcomes and Greathearts were well-known hunting blood, and some of the mares from them in the country still are breeding well.

THE MORE BREEDING A HUNTER CAN HAVE THE BETTER.

Without losing sight of size and power, for they are often called on to perform extraordinary acts of gameness, and from the thoroughbred blood comes all the pluck and courage to stay a distance, and by their blood-like action to give their riders a comfortable seat in their saddles. In a hunting-field the blood will always tell, and although I have sometimes seen true-made hunters to look at got by a cart-horse, I have scarcely ever seen one of them reach the end of a run with a moderate pack of foxhounds. It is not necessary for a brood mare to produce hunters to have been a performer herself ; but there are a few points indispensable—namely, a fine, well-laid shoulder, depth of girth, short cannon bones, with size, a good back, plenty of rib, big quarters, thighs, and hocks, with her hind-legs in the proper position under her. In the breeding of carriage horses, pedigree is not of great importance ; but without a dash of thoroughbred blood in their veins, it is impossible to have them step well. Mares to breed a carriage-horse may be of a plainer kind than hunting brood mares, but they must bend the knee, and have plenty of quality about their head, neck, and shoulders. Some years ago there was a class of clean-legged Irish draught horses in the country that could pull their 30 cwt. in a cart, or trot their master to market 10 miles an hour. They were bays, blacks, or chestnuts, of no particular breed. They stood on short, sinewy legs, with long bodies, flat of their ribs, and generally high-hipped ; long, thin heads, with hairy rough muzzles, but with a good prominent eye, which denoted determination. Such a class of horses has now nearly vanished from our country, and those which are still left are producing the best carriage and harness horses I meet. At present I know of a mare of the kind, twenty-five years of age, which has produced fifteen or sixteen live foals, with a small farmer in the county Carlow. She has been almost his principal support, and with different sires, her colts almost all brought a uniform price of from £50 to £60 at four years old in the halter, and, as the old man told me, a veterinary surgeon has never had the fortune to pass his hand over one of her progeny. Fortunate for the profession to which I belong, such a breed has died out, for disease was almost unknown amongst them in any form; but unfortunate to the tenant-farmers and the country at large, for we shall never see their like again; for, besides being a class of animals well suited to their wants, they were easily kept in condition, and came to maturity at an early age. Some of the best hacks I have seen have been the produce of our Connemara pony and a good thorough-bred horse, when they can be had large enough; besides, they generally have wonderful durability, and a share of quality. The shoulders and legs should be the principal parts to look to in the mare, as without they are well forward the animal cannot be a good hack. Thick weighted shoulders are almost worse in this class of horse than any other, as they seldom can exist in any horse without his having a tendency to stumble and trip more or less. Good legs and feet are indispensable to stand the road, and to produce which the dams should always have them well shaped, and in the proper position. There are, perhaps, no class of the equine species which will bear so much hardship as the Connemara pony, and they were well suited to the wants of the small tenant farmer of half a century ago. There is no part of my subject which will interest you, as a body of advanced practical farmers, as a few remarks on what we want to constitute a good draught brood mare—a breed which, I have come to the conclusion, even with the number of horses and mares of the kind which have been imported into the country of late years, has not improved proportionately. Clydesdales have, for years past, been looked on as a most desirable breed to introduce into the country; but I must say, in my short experience, I failed to think so, as I do not consider them, in general, suited to the wants of our ordinary tenant farmers. There is no doubt that they are fine, powerful animals, and can draw enormous burdens; but in our land, as we have here in this county, such an amount of power is seldom required; besides, where is the farmer holding 20 or 30 acres of land could feed a pair of those for a year, to keep them in proper condition (which must amount to fat)? Their action is slow, and until they are aged, they are generally what may be termed "soft horses." At the same time, there are some Clydesdale mares with clean legs, compact make, that can bend their knee, and *don't dish* in their trotting action, breed well with a thorough-bred horse; but for such a cross the breeder should always select a sire with thin and well laid back shoulders, and light head and neck, as it is in those points that Clydesdale mares are generally a fault. For draught purposes, the thick, straight shouldered, wide-chested horses are best: but wit such a conformation they must have a correspondin want of pace, which invariably, if not counteracte in the opposite sex, will come out in the progeny A good draught mare should stand from fifteen hand to sixteen hands high, and need only excel in walking which she should do light and freely, placing her foo firmly and flat on the ground. Her head should b light, but well-shaped, with round, plump, and ful shoulders, strong, muscular, and fully developed, as have said, standing upright more than oblique; neck strong and thick, as from this formation a greate weight is thrown into the collar than if the head an neck were light, with oblique shoulder; legs shoul not be too short for the weight of the body, which should be lengthy; pasterns strong and short; firm round, well-formed feet, which should be rather large with dark-coloured hoofs; loins and haunches power ful, with plenty of breadth, which assist also in throw ing weight into the collar. Any one who has watche a steady puller under a heavy load must have observe how the animal lowers the head, bends the knee, an digs the hind toe into the ground. Some of the Suf folk and Cleveland bays which have been importe into this country, and crossed with our Irish mares have produced the most useful class of draught horse to be met; they have all the spirit and quickness o action of our Irish horse, and, at the same time, th power and weight of the Suffolk. Some of the hal Clydesdales bred in the same way are good farm horses, and when not too tall suit our wants admir ably. I have met some animals got by a Norfoll horse, which stood in this county some time since which were particularly serviceable animals. I woul strongly recommend such a class of horses to you but it is somewhat difficult to get a sire of the actua stamp, as they are much looked for both for th country and for exportation. The all-importa point of soundness is now to be considered. It the essential one in the brood mare for all pu poses. It is a notorious fact that there are certai diseases of which the parents are the subjects, an which will descend to the progeny. To preven such results, which I think cause most disappoint ment, we should be particular in the examination o our mares required for the stud. In many cases a mar is never put to the stud until she is fit for nothin else; but let me impress on you that when you have mare fit for nothing else, consign her to the kennel rather than encumber yourself with her useless progeny for such they must be. It is often difficult to draw line between hereditary diseases and those the result o accident. In general, those which depend on defectiv conformation, such as spavin, splents, curbs, ringbone sand-crack; all diseases affecting the wind. Blindne and navicular disease come under the former clas although they may be the result at any time of t latter also. Spavin and curbs, although distin

eases, and depending on different causes, are found
the produce of horses which have badly-formed
cks, although both diseases may be the result of
cident. With curbs, if I found a mare with what
termed round or bent hocks, with a small oscalcis
point, I would not breed from her, as it
almost certain to come out in her progeny.
n the contrary, if you had a straight, well-
rmed hock, and only a curb on one leg,
would not consider it of any consequence.
asm, ringbones, and sidebones, I consider, are
reditary in almost any form. Indeed, ringbones
ill come out in generations, and I consider these
reditary dispositions depend on peculiar weak for-
ation of the large and small pastern bones ; or at
her times, where the legs are so shaped as the
ntre of gravity comes over the top of the hoof, nature
rows out an ossification as a strengthener to the
arts. Another hereditary disease I consider of much
nportance is blindness, dependent on disease of the
yes—specific opththalmia, a special disease of horses,
hich is certain to follow breeds, and on no account
ould I recommend breeding from either sex affected
ith it. A mare may lose an eye or become blind of
oth from an accident ; but in any case it renders
em more or less unfit as a brood mare to fill that
ffice which nature has destined her to protect and
ield from injury her offspring. Diseases of the
spiratory organs, as roaring, whistling, broken
wind, thick wind, &c., I consider hereditary diseases. Roaring, dependent on imperfect formation of the throat, horses with thick, hairy jaws, thick at their angles, and badly set on, large heads, all have a tendency to this disease, while I have sometimes found it in horses with long thin necks. Diseases in the feet in most cases are hereditary, navicular disease particularly so. Mares with narrow, mulish-looking hoofs, contracted at their heels, are invariably bad to breed roadsters, especially if it is accompanied by short pasterns, which make them more liable to the result of concussion. Sandcracks I have seen follow in families, and as it depends on a certain want of the connecting materials between the fibres of the hoof, and will often render a horse useless, it is certainly imprudent to use animals so affected for breeding, particularly if it is accompanied by flat feet, which is generally the case. In concluding my remarks on soundness, I may add that it is most important to have both horse and mare in a healthy condition, as the progeny of sickly or emaciated parents must inherit some of the delicacies, besides having a tendency in any case to materially retard and interfere with the healthy development of the foal during gestation. Perfect conformation and soundness in both male and female is of the greatest importance, and he who breeds from either, must feel assured that he cannot expect their progeny to be otherwise, as the old adage says—"like produces like."

The Dairy and Poultry-Yard.

KEEPING BUTTER AND EGGS.

THE following method for keeping butter and eggs sweet and good for almost an indefinite length of time, appeared in the *Farmers' Journal* some time ago, and is written by a master mariner who adopted it with great success. He says:—"I have conveyed my butter to the East Indies and back perfectly sweet, and have crossed the lines four times with the same butter on board, and the last year was as sweet and nice as the first, after packing. First, see that your buttermilk is well worked out. Then pack in 12 lb. oak kegs perfectly. Then pack your kegs in an oak barrel, and keep the kegs covered with brine made from Turk's Island salt. Keep them under the brine with a weight. In one year after, if good butter i put in, good and sweet butter will come out.

In reference to the keeping of eggs the plan is "T a ¼ lb. of lime, slacked with one gallon of water, add handful of salt. Place the eggs in a jar with the smal end downward, and when the mixture is cold pour i over them. Eggs preserved in this way are not s good for cake making, as the whites become thin an are difficult to froth; but they answer every othe purpose, and may be kept indefinitely." The experi ment is certainly worth trying on a general scale, as i would prove of great benefit to sailors and passenger whilst on a long voyage.

TOBACCO FOR SICK POULTRY.

A CORRESPONDENT of the *Gardeners' Chronicle* writes as follows:—"Speaking with the wife of a working bailiff who had been a successful raiser of fowls, I asked what plan she adopted when they were sickly: she quickly made answer—'I give them a "quid" of tobacco.' This reply so acted on my visible faculties that I could not follow up the conversation, but she further stated—'I have adopted the plan with success for ten years.' I then inquired why she gave it, and the quantity administered; to which she replied—'I had noticed that when my husband was mopish and out of sorts, that if he took a large "quid" of tobacco he soon came round, and the thought occurred to me that it might relieve my fowls, which it always does; so whenever I see any of them out of sorts, I give them a piece of tobacco as large as from the end of my thumb to the first joint.' You can judge my surprise as a medical man when I state that I have seen a like quantity destroy life in a human being.

Now for the sequel. In the autumn of last year I purchased some very fine prize fowls, and one of them a month since became sickly. I gave the old woman's remedy—a piece of tobacco the size of the first joint of my thumb (*i.e.*, 30 grains). It had a most speedy and singular effect upon it; in two minutes there was a little staggering, accompanied by a peculiar twitching of the tail, which gradually became straight with the back, and ultimately traile on the ground; in twenty minutes the fowl appeare quite well, and has continued so. This morning m servant, as usual, let the fowls out, and gave then some barley, but the cock bird appeared very sickl and disinclined to eat. He stood with his mout slightly opened, and wings hanging down; in fact what the old woman termed 'out of sorts.' I offere him some pieces of bread, my constant practice, b he took little notice, or of the hens, whilst eating i As this state had lasted three or four hours, I looke down his throat, which appeared healthy, and he ha nothing in his crop. I then gave him the 'quid' tobacco, *i.e.*, 30 grains. In two or three minutes h appeared very weak, and his tail began to droo slightly; he then sat down under a tree and remaine quiet about five minutes. I then walked to him when he got up, and in a few minutes commence pecking some corn, and in a quarter of an hour fro the first taking of the tobacco he appeared quite wel and began to crow most lustily, although he had n made the slightest effort before during the morning which was very unusual, as he frequently crows whe well. To see him now, twenty-four hours after th dose of tobacco, performing his accustomed duties, n one would believe that he had taken so potent remedy. I do not profess to give the *modus operand* but as it acts like a charm it is worth knowing."

FATTENING FARROW COWS.

IS is often attended with a great and unnecessary expense of feed, simply because the pro- does not understand what kind of manage- uch animals require, in order to fatten well and shortest possible period of time. Young s—and sometimes old ones also—appear to be in whether a farrow cow will or will not fatten as hile she gives milk ; and many very intelligent ave continued to milk a farrow cow until she lmost ready for the butcher, and have flattered elves that the cow was just as fat as she would een had she not been milked. But no theory more absurd.

cow, or female of any kind of animal, can grow fleshy while giving milk—one half as fat as if ere not milked. When there is a good flow of little or no fat is secreted. And why? Simply e all the nutriment in the food which they con- which would form fat or flesh, goes into the pail. Therefore the sooner we discontinue to milk a farrow cow, when we have concluded to fatten her, the sooner she will be ready for the shambles, and the greater will be the amount of tallow and flesh in her carcase.

These suggestions apply more particularly to spring and summer. If a farrow cow is in tolerably good condition in the winter, and the calculation is to make beef of her the next summer, or the next autumn, she may be milked all winter, provided she be well fed. But she should be "dried off" before she is turned to grass. Then, by allowing such cows to feed on good grass during the summer, they will make fair beef early in autumn by feeding them only with a few bushels of meal. But if milked all summer, we may expect less and tough beef, and but little tallow.

Let farmers remember that if they gain in butter and cheese by milking a farrow cow during the summer, they will have so much less of beef and tallow than they would have had if the cow had been "dried off" a few months sooner.

EGG-HATCHING MACHINES.

P-CONTACT heat is the only way in which complete success has attended the hatching of ns or any of the feathered tribe from eggs. For r three years, including 1851, Cantello, an , exhibited one of the very best machines for ng eggs that was ever invented. I have seen it ration repeatedly, and he told many in England, gamekeepers used them at the time of haymak- r there the grass is cut so much greener than it merica, that thousands of partridge and pheasant re mown out, and as some of them have been lly incubated they would be lost but for having or a machine to complete the process. The vas exceedingly simple ; water lay on the top of rubber or something of that kind, and under- were several drawers, similar to those in a n dresser. The water was kept at an equal rature, 108 deg., all through the process, by of a dish of charcoal which was raised or ed in the water to keep the even heat. The rs had spring bottoms, so that the eggs pressed up against the india rubber under the water ; e machine which was on exhibition was fixed glass instead of other material, so that those who to look at it should see without continually pull- t the drawers, and, as the water was clear, the chickens could be seen struggling out of the shell, while others would be quite out, for it was contrived that some should be hatching every day.

The artificial mother had no drawers and was low, so that the young could run in and out from under at pleasure, but was on the same principle of top-contact heat. In imitation of nature (M. Cantello told me), he took out the drawers once in twenty-four hours, and let the eggs cool off for twenty minutes, at the end of which time he turned over every egg and placed them back again, which was an imitation of nature too. The heat was greater than that used by the hatching ovens, because this was only top-contact heat. I use this phrase often, because he laid great stress upon it as the only certain way for success. This was a success ; but I do not think he made a fortune, though he must have done well during the year 1851, as his room was very much visited.

It never could be left for more than two or three hours at a time, lest the charcoal should by any chance burn wrong, and get too hot or too cold ; consequently, this constant attendance might make it unpopular with many. However, I visited it with friends so many times, that I know it was a reliable machine. The cost varied from £20 upwards, according to size. The mother was about half price.—*G. G.*

The Naturalist.

COMMON FUNGI OF THE WOODS AND FIELDS.

SO much attention has been directed towards the bountiful and spontaneous source of food which the fungi supply, that, in place of one or two edible kinds of fungus, we now count thirty-two or thirty-three. The French, always prominent as domestic economists, have long commonly used about eighteen varieties in their cookery, where, as might be expected, the mushroom is made to serve an endless variety of purposes. The Italians perhaps as many more, and not precisely the same either—so true is that adage that "what is one man's meat may be another man's poison," that in the south of Europe almost the only mushroom that is *not* admitted into the culinary service is the one which in this country we have almost exclusively gathered for use—the Agaricus campestris, or common mushroom.

Paths leading through great belts of woodland, and encircling, perhaps, the spacious parks of an extensive grazing farm, present alternately examples of the exquisite mushrooms that abound in the pastures, and of the remarkable fungi that appear in the woods. Conspicuous amongst the latter will be found some huge bell-shaped fungi. We pause not to pronounce their names. Daring food speculators, in the *Gardeners' Chronicle*, have [illegible] tasted them and found them preferable [illegible]steaks a [illegible] declared [illegible] sudden magic [illegible] their [illegible] appearance upon spots be[illegible] several widely-spreading, pure white specimens exhibit a skin nicked or split all round the edges, as if from overgrowth the cuticle becoming too tight had split. These are sometimes found multitudinously disposed in tracts, as if they had sprung from seed sown by an invisible hand, and occasionally resembling, when seen i approaching them from a little distance, a strip of white paper stretching across th path. The cracks in the skin tell the stor of how this sowing has been accomplished, as they represent the rupture of the sac which had contained the spores, and it depends upon how the wind blows which wa the fine little cloud of dust shall be carried One fungus revels in a smell as formidable a that of the polecat, and not at all dissimilar. Crush it, armed with your glove, a the motto of a Highland chief enjoins, t "touch not the cat but (without) the glaive' (sword — meaning that you had better kil him), and you may part with your best kid whenever you please, since nothing you eve do will remove the divine afflatus.

It is in pastures frequented by dairy cows and especially by Irish cattle, that the mos plentiful supplies of edible mushrooms (Agaricus campestris) are to be gathered. Th passage of the spawn through the intestine [illegible] the [illegible] animals is evidently favourable t [illegible] [illegible]ation of this fungus, and conse[illegible] v and horse dung are foun[illegible] h for heat and fertility in th [illegible] the various kinds of mush[illegible] our markets now begin t [illegible] it is not very safe indeed to tak mushrooms of a natural growth save from pastures, for, despite the "beefsteaks" of th daring experimentalist already alluded to, th woods, more especially, are infested with many

ties as pernicious and poisonous as the
some common toad-stool (Agaricus
sus). Amongst cultivated mushrooms
e is even a dangerous variety; and in
len beds themselves deleterious fungi will
ng up amongst the others. The proper
s of mushrooms are usually distinguished
heir rich and grateful odour, although it
qually true that many sorts accounted
ious are far from being in this respect
greeable.

n Russia and Poland, as well as in the
er countries alluded to, more than thirty
ds of edible fungi are known to the
santry. All of these are, at the same
e, natives of Britain, where it becomes
y matter of surprise that so vast an
ount of human food bestowed, as it were,
the manna in the wilderness, but, like it,
tined to perish in the night, should, popu-
y at all events, be limited to the use of
solitary species. The numerous cases
poisoning recorded as resulting from the
rovident consumption of fungi, evince
t, in fact, none but this particular species
be safely gathered for use by our indis-
ninating country people, except by botani-
sanction. In France we hear but seldom
such occurrences, because the law pro-
its any other than the common kinds
stly the little *champignon* and button
shroom) from being exposed for sale in
markets, although it does not, and can-
prevent their being gathered and eaten
re the peasantry possess a knowledge of
right sorts. In Germany, all sorts may
publicly sold, but must first pass under
inspection of a competent officer, who
st also be a competent judge. In this
ntry the state of general cultivation per-
ing the surface precludes the same extensive growth and use of fungi in the natural way as in those countries. We may, indeed, consume them amongst ourselves raw, boiled, stewed, roasted, and in gravies and ketchup; but they are never found with us drying up the chimneys, saved for winter food. Much of the effect produced by mushroom eating, it would now seem, depends upon the cooking, and particularly on the careful removal of the skin, which is sometimes poisonous when the other parts are not.

At this moment, our fields present, in addition to the common or cultivated mushroom, those of the violet or blue kinds, the cinnamon, milky, chautarelle, champignon, orange, solitary, grissete or tall, sweet, mansseron, and fairy-ring or Scotch bonnets (in praise of which, particularly for flavour, see Mr M. C. Cooke's paper in *Science Gossip*). Now, all these kinds are wholesome, many of them delicious. The points that distinguish the edible mushroom are principally the pink or flesh-coloured gills becoming chocolate as the cryptogamic plant advances in age, and the fine odour as already specified. The dangerous species most closely resembling it will generally be found slimy to the touch and disagreeable to the smell. The long-stalked, reddish, pepper, bell, and nipple varieties, are, along with the toadstool, chief amongst the dangerous sorts. A lady friend, however, informed us the other day that in Jersey she had been courageous enough to dine off a common but capital puff-ball.

The most common antidotes to vegetable poisoning by fungi are emetics instantly administered, vegetable acids, such as vinegar, lime or lemon juice, and the juice of apples (verjuice), followed by anti-spasmodics, such as ether.

The Country Gentlewoman.

RATIONALE OF THE SEVERAL PROCESSES EMPLOYED IN COOKERY.

BY THE LATE MRS PARKES.

WITHOUT entering into minute details, we shall shortly describe the *rationale* of the various cooking processes, and what are the leading circumstances which distinguish them from each other; at the same time, we shall take the opportunity of pointing out the principal chemical changes which they severally produce upon the substances subjected to them.

ROASTING.

Roasting, as it is usually practised, is fixing meat upon a spit, or suspending it before a fire, and causing it to move round; but this motion is not essential to the process of roasting. It is sufficient that all sides of the meat should be, by some means or other, exposed to the radiant heat of a fire, while, at the same time, a current of air passing over the meat carries off all the steam and other volatile substances that are raised by the process. This species of cookery is, therefore, divided into roasting before an open fire, and roasting by enclosing the meat in a heated vessel, furnished with a contrivance by which hot air can enter and pass out again. In both cases [illegible] principle [illegible] same and [illegible] [illegible] and form [illegible] an agreeable taste from its union with the ozmazome; while, the same time, the albumen of the muscul fibre coagulates by the heat, and acquires firmer consistence. The change takes plac first on the outside, and it requires a con siderable time before the heat can penetrat completely to the centre of the meat; but does so at last gradually, and the steam whic is formed in consequence, coming from th interior, and bursting out upon the surfac breaks and rends the fibres of the mea loosens their texture all through the mass, an permits some of the gravy to come out an fall into the dripping-pan, together with th melted fat. As the loss of this would rend the meat less sapid, it is continually returne upon the joint, by a long spoon, being sea soned with a little salt, a practice well know by the term "basting," without which a goo roast cannot be effected. Towards the midd of the process, the intense heat begins to ca bonise the outside, so as to form a kind of crus which is prevented from increasing too muc by turning round and managing properly th heat of the fire, and by repeating the bastin sufficiently often. Dredging a little flour [illegible] meat, to cause a froth, is the last part [illegible] process. The dripping-pan should [illegible] free from coals or ashes falli [illegible]

[illegible] roasting before the fire [illegible] England with admirable de [illegible] little seems to be wanting in th [illegible] by an experienced cook; but it mu [illegible] observed that it is one of the most dif [illegible] processes she has to perform, and th vigilant attention, with much practice, a

ary to make a good roaster. Managing
e well, so as to have it clear in front,
t as much as possible of the radiant
is essential to success. A screen
ed with tin is useful, both to reflect heat
the meat, and thus to save fuel, while,
same time, it keeps off the draught of
air that comes to the fire. To roast
well, it is essential that the fire should
e too fierce at first, otherwise the joint
be scorched. It is usual to keep
first at a greater distance from the fire.
cook is enabled to tell when the meat is
iently done, partly by its appearance,
artly by the time it has been roasting.

e meat should not be too long exposed,
to a moderate heat, as that would
ate all the juices, while it coagulated
lbumen, and would dry up the muscular
. The sapidity and completeness of the
depends upon the preservation of the
s, and that exact alteration of the exterior
ce which is just sufficient to brown it, and
develope, or rather form, by a partial
mposition, the principle called ozmazome
hich the particular flavour of roast meat
nds. It is proper here to state that, in
y contrivances for cooking, merely en-
ng the meat in a heated part of an appa-
s, without any current of air passing
ugh it, is improperly termed roasting;
reas, as will be more particularly ex-
ned hereafter, it is only baking.

is sometimes necessary to intenerate, or
e tender, meat or poultry, that is either
killed, or that is naturally tough from
If there is time, hanging it up a suffi-
t time has the desired effect. Whatever
lerates incipient putrefaction serves to
ler meat tender. It is a well known fact,
a fowl of any kind, not many hours
d, will become as tender, if buried five
ix hours in common garden soil, as if it
been kept above ground two or three
s. Fowls newly killed, and dressed
re they are cold, and, consequently,
re the fibres become rigid, are always
ler, as are all the internal parts of ani-
s.

BROILING.

Broiling is a quicker kind of roasting, by putting the meat over, instead of before the fire. For this purpose, to prevent smoke, the fire should be very equal and clear, and the meat must be turned often, using a peculiar kind of tongs for the purpose, not a fork, which lets out the gravy. As the outside albumen is set firm almost immediately, it prevents much of the internal juices from escaping, and hence the great sapidity of meat well broiled, which is justly esteemed one of the best modes of cooking. Broiling is a simple mode of cooking, often best suited and most acceptable to the fickle appetite of the invalid; and it is recommended by comfort and economy to solitary diners, and small families, as affording the means of dressing a small quantity of meat hot as delicately as the largest quantity. The English beefsteak and mutton chop are celebrated all the world over, and there are many other excellent things which are done best in this mode. Broiling has likewise the recommendation of being the most expeditious mode of cooking.

FRYING.

Frying is a kind of boiling in oil or fat. As these substances are capable of being heated to a much greater degree than water, the necessary change is produced upon the meat much sooner than in boiling in that fluid; this is also at the same time effected in some degree by the radiant heat from the frying pan; so that, in fact, the process is intermediate between roasting and boiling, and by the intervention of the iron between the meat and the fire, it gets very equally dressed. The best substance to fry with is oil; but good butter, if clarified, answers very well, though, if not clarified, it is apt to burn, and give out an empyreumatic flavour, owing to the milk it contains. Good lard, if quite fresh, will do very well. It requires some nicety to make the oil of the proper degree of heat; if not hot enough the fry will be merely boiled or sodden in fat, and not fried; and if too hot, it will be scorched before it can be heated through. Frying is often a convenient mode of cooking, as it may be performed by a fire which is not large enough for roasting or boiling. But Dr Kitchener observes, that though this is one of the most common of the culinary operations, yet it is one that is seldom performed perfectly well.

BAKING.

Baking meat in an ordinary oven differs from roasting, in this, that the substance is heated in a confined space, and the fumes arising from it are not carried off, no current of air passing through the oven. This is of considerable importance in dressing meat; in baking, the agreeable and peculiar taste of roast meat is not completely developed, a slight empyreumatic taste is acquired and communicated, which a nice palate can almost always distinguish. With respect to the baking of pies or pastry, this objection is of little consequence, as the crust defends the articles baked. With this exception, the changes produced by baking are nearly the same as by roasting.

Notwithstanding the objection we have mentioned to meat baked in the ordinary baker's oven, yet for those whose palates are not sufficiently delicate to perceive the defect, this mode of cooking has many advantages of economy both of time and expense; indeed, a careful baker, who will take some trouble in keeping the inside of his oven perfectly clean, may avoid much of the usual defects: and the oven has been significantly termed "the poor man's kitchen."

The following directions for baking meat are from the excellent manual by Mistress Margaret Dodds:—

The baker's oven [illegible] family oven, may often [illegible] substitute [illegible] gets little or no [illegible] be baked in shallow [illegible] dripping pan or a [illegible] will answer very [illegible] be baked as for roasting, but season more highly. A fillet c breast of veal, if not very highly fed, will bak as well as it will roast. The oven is equall suitable for a leg of pork, but a loin require to be sweated in roasting, it is too greas when baked. A pig, if not very old, and the baker is careful to anoint the crackling a in roasting, bakes very well. His ears an tail must be put in buttered papers, if yo would hope even to see them returned fror the oven. Geese and ducks may be bake if not old and rank; in which case, the must be sweated in roasting before the fir to overcome the flavour. A leg of mutto with potatoes parboiled and peeled, and a onion shred, makes, when baked, an exce lent plain family dish, the mucilage of th potatoes combines so kindly with the fat o the meat. The noble sirloin disdains to b cribbed in the oven; but a rump of bee slightly salted for a few days, washed, highl seasoned, and baked with plenty of butter i a deep covered vessel, is esteemed a delicac A hare or rabbit may be baked, allowin pieces of butter in the dish, and putting large piece or a rich stuffing into the insid of the animal. Herrings, sprats, salmo haddocks, and eels may all be highly sea soned and baked with advantage. Baker ovens have one great drawback; they ar accused of being real sponges for gravy, s that they often indemnify the baker's appre tices for the trouble saved to the cook. B sides, meat is seldom got home in seaso from these wholesale receptacles for all ma ner of joints. Hams are often soaked an baked, when they are used in great quantit and when the object is to cut thin. Fish, baked, must have plenty of butter. It is t observed, that most of the last-mentione [illegible] be avoided by having ovens [illegible] ones, in particular, the state [illegible] oven should be attended to. Almo every oven has a temperament of its ow Puff paste requires rather a smart oven t make it rise light. Raised paste must hav a quick oven. Practice and observation a very necessary in the management of a oven.

THE ART OF DINING.

E art of dining, properly considered,
has been pronounced to be one of
e arts. That *ars bene vivendi*, of
ethical writers speak, would probably
ermined by many of them to be the
lining well. That, indeed, would be
shallow philosophy that would ignore
y the deep importance of the subject.
mense part of human life is spent at
ner table, and the accumulated time,
nounts to years in the long run, must
atter of anxious solicitude. Moreover,
means digestion—or indigestion, as
se may be—and it is almost humiliat-
think how the intellectual and moral
of man depends on the question
er the kind or the unkind fate attends
ner. Napoleon lost one of his greatest
s by a fit of indigestion. We have no
the food was ill cooked, or he was in a
hurry and ate too fast. This is the
nt error which men encounter in the
of life, and through which they make
l blunders. But if there is a progress
eral refinement, and such refinement is
worth anything—if it is worth the while
d-working men to introduce some grace,
, and good taste into their hard-earned
—we must admit that the great dinner
on is still in an unsatisfactory state, and
elps may be welcomed that tend to-
its elucidation. A great deal of absurd-
nd some amount of injustice, is com-
l in this discussion. Now and then it
ns that there is a run on French or
an dinners. As a rule, French dinners
st eaten in France, and English dinners
gland. You may engraft French re-
ents on English dinners, but in England,
ule, you must have a substantial English
for the dinner. We have heard it re-
d, by the average Britisher, that a French
r is all very well, provided you make a
ent number of them in the course of
ay. Many a man dines often abroad because, after all, he knows that he will dine worse at home. He gets tired of the monotony where the beef of to-morrow succeeds the mutton of to-day. He longs not, indeed, like Alexander, for new worlds to conquer, but certainly for new animals to devour. It cannot be too much impressed on the domestic mind that you can get a good dinner for the same money which you pay for a bad one. Every man takes pretty well the same average bulk of daily food, and the only difference to be effected is a difference in arrangement and variety. There ought to be no more expense in giving a man soup, fish, entrée, joint, pudding, cheese, and salad, than in giving him the red, repellant, underdone joint alone. M. Agassiz has recently been insisting on the usefulness of fish diet for those engaged in brain or sedentary work; but in few houses of poor men is fish a regular dish, and in fewer still is it served with delicate cookery and hot plates. The reason lies in the ignorance of mistresses, and the incompetence of servants. The evil is greatly modified when the cook is intelligent, or the wife truly a housewife; but the combination of the two in a house of limited income is rare indeed. The difference of expense between a good and bad dinner is only trifling, but we are willing to admit that the difference in trouble will be very considerable. It implies that the servants should have the supervision of the mistress, and that the mistress should have some general acquaintance with the science. But the game is worth the candle. The trouble will be a diminishing trouble, and the comfort will be an increasing comfort. The home will be more attractive, and the meal more cheerful. The number of young ladies who could give a comparatively poor man a really fair dinner, combining the maximum of comfort with the minimum of expense, is alarmingly small. In old-fashioned circles the daughters used to be taught plain cooking;

but the plain cooking is now forgotten, and the modern cooking is not acquired. Every young lady cultivates a preference to polite pursuits—mainly novel-reading or novel-writing—which correspond with "the Shakspeare's task and the musical glasses" of the Miss Primroses. Perhaps that is the reason why the Miss Primroses of the world are left to bloom in solitude, or fall into the snares of men of the Squire Thornhill species. Life is a long game; and, to play the game w success, we need take every advantage diet, rest, change, exercise, sleep, and n encumber ourselves with avoidable cause inefficiency in our work. Of these iter mentioned, diet is as important as a other, and diet means dinner. Let us secu an improved tone in our dinners at hon and an improvement will soon be perceptil in our dinners abroad.

A GENTLEWOMAN'S MAXIMS FOR HER NIECES.

NEVER make your appearance in the morning without having first bathed, if only with a sponge and a quart of water, brushed and arranged your hair, and dressed yourself neatly and completely. Keep your clothing, especially your underclothing, in perfect order. Never let pins do duty as buttons, or strings take the place of proper bands.

Examine every garment when it comes from the wash, and, if necessary, mend it with neatness and precision. Do not sew up the holes in your stockings, as I have seen some careless untidy girls do; but take in a broad margin around the hole, be it small or large, with a fine darning needle and darning cotton, and cover the fracture with an interlaced stitch so close as to be as strong as the body of the stocking, and fine enough to be ornamental. Stockings mended in this way need darning but a very few times in the course of their existence.

Never carry coarse embroidered or laced handkerchiefs. Fine plain ones are much more ladylike [illegible]

Train yourself to some useful occupatio Remember it is wicked to waste time, an nothing gives such an impression of vani and absolute silliness as a habit of idling an never having anything to do.

If you are in your father's house, take som department of household labour upon you self, and a part of the sewing, and make your business to attend to it. Do not let call from this idle girl, or a visit from that, c an invitation from the other, interfere with th performance of your duty.

Let your pleasures come in as the recre tion, not as the business, of your life.

If you want to marry, do not court or t to attract the attention of gentlemen. A littl wholesome indifference, real or assumed, wi be much more likely to accomplish the objec Consider, moreover, that it is better to be woman than a wife, and do not degrade yo sex by making your whole existence turn o the pivot of matrimony.

If you can, cultivate to perfection some a [illegible] which you can gain an independent liveli [illegible] Do it whether there is necessity for i [illegible] do it quietly, if you can, but do it [illegible] s no telling when or under what cir [illegible] ces you may need it.—*D.*

THE

UNTRY GENTLEMAN'S MAGAZINE

NOVEMBER 1869

ABBEY THOUGHTS.

IT was one of the hottest days in August 186—; well, never mind the year, it is some time ago now; after more than a month of the ultry weather, we poor frozen-out (we quote from a distinguished er's note-book) had experienced for ears. The grass was well nigh scorched face of the earth; all, or at any rate, all ponds were dried up, and their untenants, the ducks, were reduced to g up and down the dusty roadside, g dolefully the while. And, as we is the case in Italy, the unusual heat veloped the instincts of murder and in the ordinarily well-conducted brains fellow-countrymen; at any rate more e average amount of murders had been tted latterly. Strange that difference effects of weather: during the warmth impelled to murder others; in cold g, to kill ourselves (another passage e note-book of distinguished foreigner id).

were staying in Kent, not very far onbridge, in one of the many and ble country houses that lie scattered hat portion of the Queen's dominions, r party determined on a drive to a ruined Abbey.

it has almost seemed to us curious, uch more romantic we English get at ht of a ruin on the Continent, than of one at home. Perhaps this arises from the fact that we reflect we never may see that foreign spot again, whereas in England we can do so more easily; or, again, doth this arise from the good old Anglo-Saxon custom of "running down" and depreciating everything belonging to our own country, so prevalent amongst us? Unriddle who may!

Our road took us along many of the charming Kentish lanes, where, at this time, the hops presented the only appearance of green. These were just becoming full-grown, as one short month would bring about the annually recurring "hoppers' carnival," when individuals, idle all the rest of the year, would work hard for a fortnight picking the "incepting ale." Then we drove past many large oaks, which were naturally indignant at being considered part of the hedgerow amongst ignoble blackthorn, through a tolerably large-sized village, where the principal shop was kept by a most enterprising tradesman, who united the bird-cage maker to the antiquarian, and actually possessed some very fair specimens of (very) early art; past all this, until we drove through the most narrow of gateways, resembling the "path of life" in this respect, if in no other; through the outer gate of the Convent, under an arch, until we stopped before the Abbey, where the chatelaine received us in the most courteous manner. It has been said, with very little truth in most cases, that those who hold church property never prosper (in such a case, both lunatics and idiots are destined to be very sadly off). Our hostess was a lady of, say sixty-five summers, bowed down by the weight of many cares, and past sorrows, one whom the hand of the Deity had visited heavily, depriving her of both husband and children, leaving her an infirm wreck. Failing strength had told grievously upon her—upon whom does it not tell, sooner or later—all of us (Prime Ministers alone exceped), if we live to the threescore years and ten, find our life becoming a burden to us, although the road down hill may be steep and rapid. Nothing would cheer the poor lady, to every advice to struggle against growing infirmity, her answer, was "What have I, whom have I, to live for."

Ah, me! The friends of our youth are all gone, the joyous dreams of early life are all dissipated; what matter when our soul shall leave its weary tenement of clay!

> " Brief life is here our portion
> Brief sorrow, shortlived care
> The life that knows no ending,
> The better life is there."

Our days are but few, and when they come to the last, better prepare gratefully for a better life, a "Golden Jerusalem," than to waste our time in dull repining and let crushing care corrode our heart. Though we walk through the valley of the shadow of death with faltering and unsteady steps, who shall say that old age hath not also its special pleasure, its matured delight—we trow no one. Can we tell whether Anacreon sang as merrily of love and wine when he was young, as we know he did when old and feeble and well-nigh the grave.

The Abbey, an antient Benedictine Nunnery, is still a venerable and instructive, although small ensample of perpendicular gothic. The crypt we found turned into a wood-cellar, and the refectory, where the holy nuns, in days of yore, before the evil days had come for them, ate their frugal meals, was turned into a kitchen. Sooth to say, those meals [illegible] but little cookery. Here, where dim [illegible] the sound of orisons before, during, and [illegible] breaking of fast, now resounds the clattering of saucepans.

The Chapter House now forms the scullery. Alas! though the Nun's fare might frugal, yet we fear my lady Abbess was occ sionally afflicted by that bodily state whi the (in more senses than one) great Banting used to profess to palliate. U happily, he had not arisen in those day but, perchance, "vixeri fortes ante!"

Think ye that, although those Nuns ha retired from the turmoil and strife of t outer sinful world, therefore their though never wandered upon mundane thing See that young Nun, over whose fair hea scarce twenty-two summers have passed, ho beautiful she is—how devoutly she kneels that remote dark corner of the chapel! Wh are her thoughts? Are they *all* prayer Alas! her thoughts are wandering far awa back to that sweet time now, five years syn where, from her lattice window, she se greeting to that bonny young warrior w now lies buried on a foreign strand. H mind takes her back to that last evenin before he left her, joyous, high-spirite glorying in his godlike strength, to fight h country's battles in a foreign land. On th eve she plighted her troth to him, whilst t nightingales trilled their song, exulting in t spring time of the year; and then—ah me she shudders when she recalls the fearf moment when she first heard that her youn cavalier lay dead, far from her, in France- that Gaul which she had learnt to hate wi instinctive hatred since her first communio Yes, and now she bows down lowly befo that altar, whither the dull course of religio routine forces her some nine times dai from sunrise to sunset, and yet again in t troubled night, and ever and anon pou forth her anguish before the Almighty thro

"A broken spirit and a contrite heart, Lord, Thou wilt not despise." She has l this world these many years. God rest h soul! She has, mayhap, rejoined her lov one in heaven above, where "neither mo nor rust doth corrupt." Who knowe whether that chastening was not for h eternal welfare? How many of this world calamities which we, poor worms "of a day think will overwhelm us, crush us utterly, a after all, of no such great account.

sages, how many of us, think ye, this year of grace, 1869, be wiser ıen had the stern old disciplinarian, er burnt down and utterly destroyed the Nile, with its famous library? none. Perchance some "Dryasht thereby have been enabled to ›re mouldy and moth-eaten tomes ıbout amongst and ponder over, hould get light-headed (if such a ver befall a "Dryasdust"); but of have already over and above

mer of the Abbey at the time we having another property in the nty not infected with the fancied Church property," took good care re there, although the situation is sly pleasant. A bubbling brook before the door of the Nunnery. ly in their generation did not our choose their places of retirement world? Did not Charles Quinze e pleasantest Monastery in his whole nions wherein to end his days?

is the Monastery situated (unless, be that of La Trappe) which has fts of nature strewn thickly around two following lines illustrate most distinction of situations chosen by principal founders of the Monastic

> ırdus valles, colles Benedictus amabat,
> da Franciscus, magnus ignatius urbes."

exception, of course, of those rare which some truly pious man founded r for austere and penitential pur- There are few instances in which ›se worthy men and women who Convents did not look for a pleasant rein to end their days.

e, can there be found, a more lovely in Europe (waiving the claims of inople and the Golden Horn, which ll the finest, the author does not) ıt of the Carthusian Monastery at Yet San Bruno was a real ascetic, situation he chose was the least so the lovely Bay stretches away before and below it in one uninterrupted sheet of azure, reflecting, as it were, the steep ascent to the Monastery. Cool in the summer, owing to the grateful shade imparted by the mountains on the right, this "certosa" is warm in winter (if there be a winter in Naples), protected, as it is, by those same mountains from north and east winds. The town of Naples lovely (from a distance—examine not too curiously), stretches out to the left far beneath in terraces. Orange trees grow all around, the soft breezes blow up from the calm blue Mediterranean. All here—scenery, vegetation, climate—combine to render the spot agreeable—"where every prospect pleases, and only man is ——" (well let that pass). The worthy Monks, now sadly reduced in numbers, have contrived a hanging balcony over this lovely scene, and when the unwary traveller is reduced to the melting mood, from the influence of its splendour, the "genius loci," an old monk, steps in (or used to step in) and demands charity in the name of the Convent! Our Abbey here cannot boast of any such enchanting scenery; but, according to its lights it is very picturesque, in the quiet and subdued style of English beauty. Groups of fine old trees grow in the "ci-devant" conventual garden, and scatter grateful shade around, whilst the murmuring stream continuously flows onward.

How many a busy spirit emerging into that garden through the Convent gate, during the short interval left from prayer and mortification, has, mayhap, sat herself down by its side and moaned her fate, chafing against the chains now for ever wound around; her strong spirits cooped up within yon narrow cell, longing to burst the bonds that fetter them to this spot for ever. Aye, and what is that dark story of the recreant Nun, who one dark night escaped the vigilance of the watchers, and emerged through the filed bars of her cell window, only to be caught again next day, after dropping asleep by the wayside, exhausted by fatigue, and was never heard of more? What, when part of the outer wall fell down, betokened those blanched bones which were discovered amongst the ruins? Such the penalties, the holy Roman mother church imposed on her apostate daughters.

Now-a-days, in our more perfect state of civilization, we only immure the sempstress of her own free will in the dark dungeon of an upper chamber, to work, to stitch, stitch, stitch, till she exchange this weary life for a better. We treat our convicts (especially Fenian), more daintily; trust us. As many dark deeds are perpetrated every day now as then, but we do them in more humane (?) and scientific manner, and are more seldom found out. The spirit and nature of man change not with the cycles of the moon; may be when our millenium cometh, we may alter. But would it be altogether to our advantage had we altered? We wist not. Let us hope that the lady Plantagenet still would act as Lucretia acted, although patient Penelopes are sadly diminished in number, and out of fashion. Not many of our fair countrywomen would wait ten years for a lost husband, and rather like it. Our Jezebels who paint their faces, and dye their heads, are, we trust, not now as numerous as formerly, although, no doubt, Madame Rachel's memoirs, if ever published, would a tale unfold. But wickedness has as great dominion now as in the days when there were kings in Israel. The fear of our neighbours is still the great mainspring of our actions, and few of us do charity with our right hand, without letting our left know of that fact also.

What, indeed, would become of the *Thunderer* during the recess, were it not for the long list of subscribers to various benefactions it publishes then; we are not chary of letting our good works be known unto all men—perhaps, because we have so few to pride ourselves upon. Think ye not that many a man gives his money to a charity in order to see his name printed in the next list? Vanity—[illegible] powerful [illegible] fancy the looking-[illegible] great deal to answer for [illegible] the eye. Had Queen [illegible] felt vanity and jealousy, the fair Rosamond might have lived to the ter of her years. Ye proud beauteous dam how many of you would shrink from infli ing the "cup or dagger" on your rival, ha ye the power. Oh! ye would not own thi we know that this desire lies hid in t recesses of your hearts for ever. No doub even in these quiet cloisters, these diml lighted cells of the Abbey, jealously guarde a stormy reign may be. The struggle as t who should be the lady Abbess, no doub was a fierce one, although it might be hidde from the outer world. Those peaceful Nun each had their own heartburnings, their year ings, their desires. As long as this strang aggregation of particles we call the world sha exist, so long must the common passions mankind, and the sentiments, the struggle of human breasts, maintain their swa and jealousy always stand a conspicuou trophy on life's sideboard. "Do unto other as ye would others should do unto you," i indeed a divine command, but seldom con sistently followed out. Often, no doub when we have this text in our recollectio we attempt in some small action, perhap even in an important crisis, to act up to i but which of us ever did, or will, at all time Sir Philip Sydney, indeed, acted even nobler part, if possible, when he commande the cup of cold water, brought to him wi so much difficulty, to be given to a wounde soldier—for he did good, knowing the li could never be done to him in this life. N doubt he obtained his reward. The Roma Emperor lamenting at the close of day, th day was lost, since he had not made a fellow-creature happy upon it, gave us, w call ourselves Christians, a bright example follow. Happy indeed is he who at eve tide can say, "This day have I done no ma an injury," and include himself therein.

These thoughts were suggested by t sight of the weather-beaten walls of the o Abbey, which in its day had seen the passi away of many generations, whilst constant renewing its small commonwealth.

STABLES—THEIR ARRANGEMENT AND CONSTRUCTION.

[Continued from page 196.]

A REPORT has recently been presented to Parliament on the ventilation of cavalry stables, from which the following extract is taken, and which has various considerations bearing upon the points already discussed:—

"In constructing new stables, the great principle which ought to be kept in view is to have the air moving freely through every part of them, above and around the horses when they are standing, and in all the angles between the floor and walls when the horses are lying down; and every horse should have sufficient ventilation for himself, without being obliged to breathe the foul air of his neighbours. These conditions would be most completely obtained in an open shed, such as is used for stabling horses in warm climates, and the nearer we can approach to this construction, keeping in view the necessity for protecting horses in this climate, while at rest, from extreme cold and cold blasts of wind, the healthier will be the stable.

"There are certain forms of construction which are precluded by this principle, and which ought not to be repeated in future stables.

"The worst of these is the old construction we have described, of placing the men's rooms over the stable space, and dividing the space transversely by walls into a number of separate stables, having each two rows of horses, with their heads to the division walls, and the windows and doors at the ends.

"The most cursory examination of such a stable is sufficient to shew that only the four horses in the corners can be supplied with fresh air under the conditions we have pointed out. All the others have very foul air to breathe.

"We beg to recommend that this method of construction be in future abandoned, as inconsistent with ventilation and health. All existing stables of this class can be somewhat improved, in the manner we shall recommend, but the construction is so opposed to sound principle that it ought not to be repeated. One of the most important points in our inquiry has been into the effect of its ventilation, of placing anything except the roof over the stable. We are aware that there are differences of opinion on this point, but after careful consideration of the examples of various classes of construction, we have arrived at the conclusion that there is a degree of efficiency in considerable difference among them in the ventilation arrangements, and also in the possibilities of ventilation, and that, beyond a doubt, that form of construction which affords the maximum of facility for obtaining a free moving atmosphere throughout the body of the stable, is the open roof, with ridge ventilation carried all the way along.

"Where the roof of the stable is not open, but flat and impervious, the distance between the effective ventilating openings, whether windows or other apertures, corresponds, of course, to the breadth of the stable. But with an open roof and ridge ventilation, the distance is reduced to one-half, while the difference of height above the ground between the ridge opening and the side windows ensures, according to a well-known law in pneumatics, a far more cerain and continuous movement of the air that could possibly take place with side windows alone, unless a high wind were blowing.

"For the same reason that the best ventilated and most healthy barrack-room is a hut ventilated along the ridge, a stable with ridge ventilation is the most healthy stable.

"A flat impervious roof, a hay loft, or a barrack-room over a stable increases the difficulties of ventilation. Our object being to obtain the best possible ventilation for stables at the least cost, we cannot do otherwise than object to any of these constructions. As already stated, where such exist the ventilation can be improved by methods we shall afterwards suggest, but in future the structure should be avoided.

"In so far, then, as concerns the general movement and removal of the mass of air in a stable, the form of construction which effects this most easily and efficiently is an open roofed stable, with ventilation along the ridge, swing windows along the sides, and a continuous inlet for fresh air under the eaves, made of perforated brick, so arranged as to throw the entering currents up towards the roof.

"A great incidental advantage of the open roof should not be overlooked, and that is the facility with which it enables the stable to be thoroughly well lighted. Light is, in its place, as essential to health as air, and, moreover, when introduced vertically from the roof, it enables the state of cleanliness of the stable to be seen at once, while the conduct of every man in the stable can be seen from a considerable distance. These advantages struck us forcibly in comparing the different classes of stables.

"Stables without open roofs have no natural means of removing the mass of air in the stable, except by opposite windows or doors, or by apertures made in the walls. When these are properly used, and when a wind is at the same time blowing more or less directly against the side of the stable, [illegible]

The state of the air we found to be bette some than in others, and much better, doubt, in all than it would have been in absence of the shafts; but the results g rally shew that it is a mistake to const stables on a plan which renders such sh necessary. There is, no doubt, an additi movement of air effected by them, but i questionable whether any practicable siz shaft would ventilate such stables sufficie The results rather tend to shew the bad c acter of the construction of the stables.

"As regards light, hardly any of the clo roof stables are sufficiently lighted. S are better than others, and the best lig are those which contain the smallest num of horses, and have the greatest height, account of the windows permitting the l to fall at a higher angle. But they are very much inferior in this respect to o roofed stables, partially glazed.

"Besides providing for free movement o mass of air within the stable, it is neces in all stables, but in some much more t in others, to supply fresh air near the gro level at the head of each stall, so that horse may have fresh air to breathe when is lying down.

"The reason of this necessity is, that i stables the stratum of air next the level is the most impure, and will alway the most impure under any improved c tions of drainage and paving. Besides the horse, in lying down, places his close to the angle between the floor and wall, where the air is stagnant.

"The necessity of providing a slight cu at this angle has been recognised in n stables as the remedy of a defective stru [illegible] a shaft in the wall carried [illegible] of the stable, and communi [illegible] with the outer air. There [illegible] a sliding cover communi [illegible] the shaft in each stall at 6 or 8 i [illegible] the ground, through which the air [illegible] propose to extend this im [illegible] existing stables by having a [illegible] fresh air at outer air und [illegible] In all stables where the horses' [illegible] are placed against the outer walls, shafts should have at least double the section per horse of those at present in use for transverse stables. In stables where the horses' heads are placed against the outer wall these horizontal air shafts would not be necessary; simple openings, and air bricks in the outer wall would be sufficient. Perhaps the best place for these openings would be between the stalls, where they would be less likely to occasion draughts on the horse during high winds. They should consist of small perforated bricks, or of bricks so made as to throw the air currents downwards to the floor. Two or three such bricks in line would be sufficient for each stall, and they should be placed about 6 inches from the floor.

"In stables with the horses' heads to the outer walls, one such brick per stall would be sufficient. It is an incidental advantage of this method of arranging the stalls, that it admits of greater facility of this under ventilation than any other form of stable.

"It follows, from what has been said, that the easiest and most efficiently ventilated stable, is the open roof partially glazed, with ridge ventilation all along, ventilation at the eaves, a swing window, per stall, and the horses' heads turned outwards, with a proper air-brick in the outer wall, introduced 6 inches from the ground, between every two stalls. We were very glad to find that stables with open-roofs are coming more into use. As already stated, we found them in use at Aldershot, Colchester, Hounslow, and York, for officers' stables, troop stables, and infirmary stables. The examples at the different stations vary in details, and in adaptation for their object. But, taken altogether, we believe that it is impossible to deny the great superiority they possess, as healthy stable construction, over any form of the old close roof, with barrack or other accommodation over the horses.

"So far as concerns health, Mr Wilkinson informs us that these open roofed stables are free from sickness, while the old form of stable yields the usual amount of disease among the horses."

We now come to the internal arrangements of the stable for the economical supply of food. And first as to the hay-racks. The form almost generally adopted is that made by bars, resting on their lower ends, on the wall a few inches above the manger, and springing angularly therefrom, so that, at the top, a considerable distance between them and the wall is left; into this angular receptacle the hay is put by an opening above, communicating with the hay-loft. This is a wasteful contrivance. Its disadvantages are numerous; the seeds of the hay, valuable as they are, are totally lost, and, from the inclination of the rack, they are allowed to drop into the horses' eyes and ears; moreover, the bad effects resulting from the plan, in connexion with improved systems of feeding, should at once be instrumental in discarding the old-fashioned hay-rack from practice. The attendant can have no proper control over the quantity taken by the horse when the food is supplied by the rack. This stuffing of themselves induces many diseases in valuable horses. The following plan may be adopted:—Where the head of the stall is formed by the wall, a recess should be left therein, some 14 inches in depth, 2 feet broad, and 3 long. The front of this should be made of open spars running perpendicularly to the floor of the stall, and the frame thus provided with spars should be hinged at top or bottom to allow the rack being cleaned. A perforated false bottom should also be provided to allow the seeds to drop through to a box beneath; these may be removed when necessary by lifting up the bottom. As the horse, in pulling out the hay, frequently causes much to drop on the floor, or into the manger (if the latter is beneath the rack), a sloping board should be placed at the bottom of the rack, communicating with the seed-box. The rack, instead of being fixed in a niche or recess in the wall, may be supported by brackets fastened in the wall; these brackets should have holes made in their projecting parts, and the wooden racks provided with hooks to slip into these holes, thus supporting them. This advantage is a valuable one, as the racks can be at once removed and cleaned.

One of the disputed points in the fitting-up of stables, is the *position* of the hay-racks. "The prevailing opinion," says Mr Stephens, "may be learned from the general practice, which is, to place them as high as the horse's head, because, as it is alleged, the horse is thereby obliged to hold up his head, and he cannot then breathe upon his food. Many better reasons, as I conceive, may be adduced for placing the racks low down. A work-horse does not require to hold up his head at any time, and much less in the stable, where he should rest as much as he can. A low rack permits the neck and head, in the act of eating, to be held in the usual position. He is not so liable to put the hay among his feet from a low as from a high rack. His breath cannot contaminate his food so much in a low as in a high rack, inasmuch as the breath naturally ascends, and as breathing is employed by the horse in choosing his food by the sense of smell, he chooses his food from a low rack; whereas, he is first obliged to pull it out of the high one before he knows he is to like what he pulls. He is less fatigued eating out of a low rack than from a high rack, every mouthful having to be pulled out of the latter from its sloping position, by the side of the mouth turned upwards. For this reason, mown grass is much more easily eaten out a low than a high rack; and, lastly, I have heard of peas falling out of the straw when pulled out of a high rack, into an ear of a horse, and therein setting up a serious degree of inflammation."

In cases where there is a passage leading behind the heads of the stalls, an arrangement possessed of many advantages, it is obvious that great convenience will be obtained in cleaning the racks, cistern, &c., by having a portion of the partition removable, [illegible] hinged, so as to open at pleasure. In [illegible] stalls on this principle, many [illegible] advantages will be more easily [illegible] the plan where the wall [illegible] head of them.

In [illegible] up the manger there is no necessity for having it underneath the rack, indeed, such a situation is the very one which ought to be avoided. The best place for it will be alongside the cistern, &c., both being placed in the corner, opposite to that in which the rack is placed. The oats and beans, as supplied to the manger, may either be put in by hand, or let down from the loft above, through pipes or conduits, provided with moveable shutters, to regulate the downward flow. We have already, in a former part of this paper, described the cistern arrangements.

In designing stables, attention should be paid to certain architectural and structural arrangements here indicated. The situation of a building is of some importance. The best position is where the front has a south-easterly exposure, rather more easterly than south; the rising sun thus finds access at all seasons of the year. As no animal delights in cleanliness and freedom from smells more than the horse, no building, as hog styes, &c., should be near a stable; in fact, the sweeter and purer the air, both internal and external, the more healthy will the animals be. Separate apartments should invariably be provided for harness cleaning and storing of medicines, &c., machinery for cutting and mashing food, the preparation of hot mashes, and boiling hot water. This latter apartment should in all cases be made fireproof. The best arrangement in this apartment will undoubtedly be—the boiler and furnace in one corner, and a range of tubs or tanks for the preparation of the various mashes ranged round the room, boiling water, &c. We are inclined to recommend the use of steam, it can soon be raised, and by having pipes leading to the various tubs any quantity of water or mash may speedily be boiled. The breadth of stalls should not be less in any case than 6 feet; the partition between each should be made of solid boards not sparred; and the divisions will be better if they are not fully up to the ceiling, yet high enough to prevent the horses from looking over. Double stalls are not to be recommended; if, however, they are used, each horse should be fastened to the opposite side and have his own rack, manger, &c. All the windows should be made to open wide, or hung on a central swivel, so that in addition the ventilation provided by other means, e air may be admitted in large volumes in ot weather during the absence of the animals. eans should also be provided for darkening e interior. This may be done by shutters, ut the neatest and best way will be by outide verandah or Venetian shutters. It is ssential that close stalls should be proided for the reception of sick animals; hese should in every respect be separate rom the others. The desiderata in all tables are, the convenience and health of the nimals, the economization of labour in giving the animals their food, facilities for obtaining ready access to the stalls, and the necessary provision made to ensure their comfort. The contrivances and plans we have indicated may doubtless be much improved, but, upon the whole, the desiderata mentioned above will be attained in considerable perfection by their adoption in the way we have described. The subject is one of considerable importance, and proper structural arrangements are surely worthy of the attention of parties engaged in designing and erecting such buildings.

AMSTERDAM AND ITS EXHIBITION.

A GREATER number than usual of English and other tourists have, we believe, visited Amsterdam this year. We say than usual, for, as a rule, Holland is not favoured much by Continental tourists, to many, if not the majority of whom, it is the *bete noir* of Continental travelling. The prevailing idea being well expressed in the phrase which Charles Matthews, in the farce of "Used Up" employs, when saying that he climbed Mount Vesuvius, looked down its crater, and found that there was "nothing in it." Yet, notwithstanding that this is the popular opinion respecting Holland, that there "is nothing in it," and that, to a large extent, it really is true, when we compare its flat expanses of pasture fields, intersected with its innumerable ditches and canals, with the glorious scenery of other parts of the Continent. Still, there is in a tour through Holland, much to please the eye of the artist, as well as to interest him who is more concerned with material things. Viewed in its humanitarian or social aspect, there is, perhaps, no country which possesses such remarkably interesting features as Holland. We have to consider that its history is only some six hundred years old, that almost every inch of its fertile fields has been wrested from the grasp of old Ocean, that it is wealthy now, and has for long been so, that its people are the most industrious of any nation, that all progress has been made in face of obstacles which might well have been looked upon as insuperable, and might reasonably have damped the ardour and stopped the labours of a people less determined and industrious than the Dutch; the interest which a tour through their land possesses, when made thoughtfully, and with an observant eye, will be at once understood; and, we doubt not, in practice, will be appreciated by those who possess the one and exercise the other. But, as it is with a special part of Holland we have to do, not with the country generally, we leave this tempting theme, and pass on to the more immediate object of our paper.

Amsterdam, although not the seat of the government of the country, is by far the largest, as we believe it is the wealthiest, city of Holland. In itself, it affords the most gigantic evidence of that indomitable courage and that persevering interest which admits of no obstacles to mar or prevent their realization, to which we have already alluded. The whole of the city is placed upon ground which has been wrested bit by bit from the sea. Solid ground in no sense could it have been called when the determined Dutchman took it in hand. Slimy mud rather was it, which could only be made strong enough to bear the weight of houses by special means. Thousands and thousands of wooden piles have therefore been driven into the mud, to form foundations for the various structures. Some idea of the number of these may be formed from mention of one fact—namely, that nearly fourteen thousand piles were required to form the foundation of the great palace. This palace, formerly the Stadthouse or Town Hall, and which owes its existence to a Bonaparte, is well worthy of a visit. Its galleries and halls are both fine and numerous, and an immense weight of white marble has been used in their decoration. The view from the tower is peculiarly characteristic, and is well worthy of the labour—doubtless in warm weather somewhat fatiguing—incurred in the ascent. The whole of Amsterdam, and a very large extent of the country round—so flat is the surrounding country for miles — of this part of the kingdom, lies mapped out at the feet of the spectator. Amsterdam has been called a kind of "vulgar Venice," but it is only in some of its aspects that it is vulgar—and those which every large town both abroad and at home shares with it. Indeed, in many of its aspects it is a regal town, it possesses good buildings, numerous fine, nay, very handsome shops, and everywhere surrounding the passer by, evidences, if not of great wealth, still of handsome competencies and abundance of comfort. If the streets are not wide and spacious, they are, at all events, picturesque enough; and are in almost every aspect thoroughly different from those of our own towns. The canals intersect the streets everywhere, and crossed by bridges—the name of which, in truth, is legion—remarkably quaint and curious views are frequently opened up. True, the thoroughly picturesque element is more frequently to be met with in other towns of Holland, such as the Hague, Delft, Leyden, Haarlem, Utrecht, Gouda, and the like; but still, there is enough of it in Amsterdam to please and gratify the artistic eye. No doubt, they have to be looked at, if not for; and we confess how frequently we have been surprised to find tourists who saw nothing, or, if they ha seen, had remembered nothing of that whic abounded in interest to others.

Further, in the peculiar dresses of many o the people, and in the thoroughly characteristi architecture of many of the houses, there ar elements of strangeness sufficiently develope to add another interest to this fine old town Nor to those who go to "do" the city in a artistic way is it lacking in objects of interest It possesses several public places and privat collections of no small worth. The visitor, whil at Amsterdam, should not fail to visit th village of Zaandam, within half-an-hour's sail where the cottage inhabited by Peter th Great, while at work there as a shipwright is still to be seen. The sail down is also interesting, as it affords an opportunity of seeing much that is specially characteristic o Dutch work in connexion with the dykes t keep out the sea from the land. The windmills are very numerous in the neighbourhood of Zaandam. A visit should also b paid to the great ship canal, which commence at a point opposite Amsterdam, and extend to Hexel, a distance of 50 miles. Very e tensive works are now being carried on i reclaiming a large portion of the sea, and i cutting a canal near Velsen, which, commun cating with the North Sea, will save some 3 miles of intricate navigation, and brin Amsterdam as near to London as Rotte dam now is. The gigantic nature of th works will best be seen at Velsen and Sche lingwoude.

As already stated, Amsterdam has bee visited this season, or was visited at the peri of our sojourn in the city, by a greater numb of tourists than usual. We believe that th arose from the attraction, or presume attraction, presented by the Exhibition no being held there. We fear that with ma visitors, if not, indeed, the great majority them, that this will not be thought to be attraction at all. Indeed, at first sight, seems to be but a huge bazaar, and tha moreover, made up of articles met wit everywhere, and possessing but few points special attraction. But this view, althoug no doubt it will be the general one taken t by tourists who have only been through its lleys and galleries, is scarcely the correct one. It possesses some specialities which are not only interesting, but really valuable, from a social and an economical point of view. Originally, the plan of the Exhibition was to draw together a collection of objects useful to the poor, and those classes immediately above them, and which were calculated to add to their household comfort and to their individual health. This plan has, to a large extent, probably to the largest possible extent, been broken, and the result is, that the Exhibition is in many aspects a mere bazaar, an *omnium gatherum* of all kinds of things which are to be met with everywhere, in nearly every shop; although, in some other aspects, there are specialities which offer some points of interest. What these are, we shall see as we proceed; meanwhile, we note that the Dutch alone have carried out their part of the programme of the Exhibition, which, seeing that it is a Dutch one, is just what things ought to be. The result of this is, that a patient observer will be able to find illustrated in plans, models, figures, and actual objects of house-furnishing, &c., a fair view of what peasant and poor man's life in Holland is. We say this will be shewn to a patient observer; but perhaps only—to him only by chance—will it be shewn to the visitor who hurries through the Exhibition, anxious only to "do" it quickly, careless whether he be "done" or no. For, to our mind, there was rather a lack of correct classification in the Exhibition. There, as in other exhibitions of the kind, we find as part of a group of objects one or two which do not in any way belong to it. This is exceedingly annoying; but the fault seems inherent in all exhibitions, at least we have found it so in those we have attended. We believe we have been at them all. This fault being apparently inherent in exhibitions, it can only be repaired by patient observation, and a less or greater amount of this serves to clear up difficulties, and enables the visitor to decide upon what is worthy of being looked carefully at, as distinguished from those objects which, if not altogether worthless, possess at least inherent interest.

The objects of the Amsterdam Exhibition are divided under different classes, at least, so far as the catalogue is concerned. The first is devoted to plans, models, and works descriptive of cottages, workmen's houses, &c., baths and washhouses, and specimens of the materials of which they are constructed. This department or class is the most interesting, as it is the best represented. It was a matter of regret that they were not represented in one part of the building, but were scattered more freely than pleasantly or profitably, if time is taken into account, over more than one place in the same. Some of the plans were exceedingly suggestive, if not of points to follow, at least of those to avoid. The Dutch contributors were the most numerous, although the French and the Belgians did not put in a bad or poor appearance. The plans and specimens of construction exhibited in the British Section were few in number, but good. The Society for Improving the Condition of the Labouring Classes, London, exhibited several of their plans, and Mr J. E. Watson, of Newcastle-on-Tyne, shewed a pretty large collection of plans of cottages, &c. Of objects connected with construction and fitting-up, the principal exhibitors were Messrs Brooke & Sons, of Huddersfield, who exhibited specimens of ventilators and stoneware; Messrs Doulton, of Lambeth, London, specimens of their drain tubes and terra cotta arches; as did also Messrs J. Cliff & Sons, of London. Messrs Maw, of Brosely, Staffordshire, exhibited a fine collection of the encaustic tiles for which they are so celebrated. The Moules' Patent Earth Closet Company, of London, entered an appearance with specimens of their now well-known sanitary appliances.

Farm Architecture.

CONCRETE BUILDINGS AT THE WAVERLEY HYDROPATHIC INSTITUTION.

IN an article on concrete buildings, at page 199, we alluded to the application of Drake's Patent "Concrete Builder" in the construction of the Waverley Hydropathic Institution, which is now being erected near Melrose, and having recently visited the same, we are enabled to give the following further particulars relating to the progress and efficiency of the work.

The proprietors of this Institution have made an admirable choice of a site for it, within half-a-mile of Melrose, and about a mile and-a-half from Abbotsford, where, on the banks of the Tweed, they have leased from the proprietor, Allan Freer, Esq., fully 15 acres of beautifully sloping and undulating surface, rising from the river's edge to the top of the Skirmish Hill, where the buildings are being erected, and where, in 1526, according to local tradition, the battle of Melrose was fought, when Scott of Buccleuch, at the instigation of the Earl of Lennox, attempted to liberate the youthful King James V. from the thraldom of the Earl of Angus, but was defeated with a loss of more than eighty of his followers. This site commands beautiful and extensive views of "Tweed's silver streams," and its richly wooded banks, stretching far down beyond Dryburgh Abbey, where lie interred all that is mortal of the world renowned author of "Waverley;" while in divergent directions may be seen much of that border scenery which he intensely admired and so rapturously depicted. Southward, and in near proximity, are the three elevated summits of the Eildon Hills, which appear, as if rising out of the richly wooded slopes of Abbotsford, Melrose with its antient Abbey and modern spires together with Darnick Tower and surrounding villas, filling up the foregroun Westward is seen the gorge of Gala-wate with the thriving town of Galashiels nestlin between the wood clad hills of Gala an Langlee, while at middle elevations a scattered the modern mansions of "Gala merchants and manufacturers. Abruptly ri ing from the opposite side of the Twee high ascending arable and wooded slop shelter from northerly and easterly winds while the salubrity of Skirmish Hill is furthe insured by its dry gravelly understrata, an by its height being just sufficient to clea it from those hoar frosts, dank mists, an miasms, which occasionally lie thickly alon river hollows.

The Waverley Hydropathic Institution i being erected in conformity with designs fu nished by Mr J. C. Walker, architect, Edin burgh; Mr Waugh, Melrose, being the con tractor for the concrete work. As represente by the accompanying engraving, it is of con siderable size; but, besides what is ther seen of the front elevation, there are exten sive wings and back buildings, whic are necessarily not shewn. To convey more perfect idea of its magnitude, we ma state that the height of the central towe exclusive of its roof, is 70 feet, that of th four-storey portion to the right, in which a the principal public rooms, 52 feet, and th remaining large portion shewn, 45 feet.

Shortly after the erection was commence last spring, a rumour became prevalent in th district that the back buildings alone, or non over two storeys in height, were to be built c concrete, as constructing the higher parts wit it was deemed too hazardous an experimen If such an intention was ever entertained, i is now entirely abandoned, and at leas fourths of the entire structure is either leted or in rapid progress, and mostly the first storey. The directors, archi- clerk of works, and others interested, all satisfied as to its stability and dura- , as well as to the important element of omy in construction as compared either brick or stone buildings. onfident is the last-mentioned gentle- as to the stability, that he affirmed ould have no fear for a two-storey dwel- house, even were the concrete exterior no thicker than 6 inches. But, of e, all must depend on the cement used, ell as the sand for mixing with it being he proper quality, and in its being ptly prepared and applied, so as to pre- its setting in the least degree before g put into the moulds.

e have formerly given detailed particulars rding the construction and application lessrs Drake Brothers & Reid's Patent crete Building Apparatus, and will now recur to it for the purpose of refuting bjection which has been urged against use of sheet iron, instead of wood, for ing the mould linings, viz., that it is e to become bagged, or protruded during process of packing, so as to impart un- ness to the wall surfaces. This we nined into carefully, without being able discover any such defects, and are con- ed that none could happen unless at the hands of very careless or inexperienced workmen.

In the four-storey portion of the Waverley Institution the walls of the first, or lowest, storey are 18 inches thick; those of the second, 15 inches; the third, 12 inches; and the fourth, or upper storey, 10 inches. All parts wherein are chimneys, or flues, have a thickness of 18 inches. In the one-storey buildings the walls are only 10 inches thick; while in those of two storeys the lower is 12 and the upper 10 inches. Most of the ground floors are to be formed of concrete, and those in which wood is to be used, are to be underlaid with concrete for the purpose of keeping down dampness and vermin; and a concrete platform, 46 by 26 feet, is to roof in a portion appropriated to Turkish baths, the building of which is already finished. The water for supplying the Institution is derived from strong, never-failing springs, on a lower level, about a-quarter of a-mile distant, where a small water-wheel and two hydraulic rams are constructed, which are capable of throwing up 8000 gallons per day. Besides minor erections, there is a two-storey dwelling-house for Mr Ross, an intelligent *employe*, whom we found very communicative in regard to subjects under his charge. On entering his house we were struck with the extent of its interior, compared with that presented by its exterior aspect, arising from the thinness of its walls. The windows of it are fitted up with

Carter's, of Dunfermline, Patent for opening and shutting—a safe and easy mode of applying ventilation, as well as for facilitating the cleaning of the glass, and which we were informed was to be adopted throughout the Institution.

From the preceding remarks it will be seen that at the Waverley Institution the employment of concrete in building, and otherwise, will soon be tested on a scale hitherto unequalled, at least north of the Metropolis. Among the other advantages which it presents is the important one of being almost fire-proof, and another is, that the building can be done by unskilled labourers after a day or two of practical teaching. In regard to the important item of expense, the works are not yet sufficiently advanced to admit of forming a correct estimate; but Mr Robert Smith, the clerk of works, kindly supplied us with the following particulars relative to a portion now being roofed in, which is two storeys high, containing a hall 42 by 23 feet, with an ante-room off the same 23 by 11 feet, a billiard room 24 by 23 feet, a corridor 27 by 5 feet 2 inches, an apartment 27 by 7 feet, and another 10 by 8 feet; all 12 feet inside height, and in which the cubic wall measurements are as follow, exclusive of door and window spaces:—

	Yards.	Feet.
Walls 18 inches thick .	34	1
" 15 " .	54	4
" 12 "	126	6
" 10 " .	83	8
	299	1

The cost of which was £61, 17s. 10d., or barely 4s. 2d. per superficial yard. Another wall one storey in height and 10 inches thick, exclusive of spaces as before, [illegible] per square yard.

We hope the dire[illegible] [illegible] the application of concrete [illegible] both fence and garden walls. The first we feel convinced, will come to be useful fo agricultural purposes, in exposed place where wall shelter is needed for sheep an other live stock, but where ordinary buildin stones cannot be had. Although concret garden walls are impervious to nails, the may be faced with wire-trellising so as t allow of wall-trees being easily attached; whil the smoothness of the wall faces would affor no sheltering harbour for troublesome insects Situated as this Institution is, in a distric celebrated for the diversified beauties of it scenery, for the full enjoyment of which ampl facilities are afforded, in rides over extensiv commons, as well as by foot-path, road and rail, it is further to be hoped, that no only will due care be taken to provide ampl out-door recreation grounds and well-stocke gardens, but that the more strictly ornamental departments may be largely furnished with selections of hardy trees, shrubs, and smalle decorative plants, including the now fashionable occupants of rockeries and ferneries. These might be made highly remunerativ by propagating, and disposing of Alpines and ferns to visitors and owners both o large and small gardens, by whom they ar now coming to be regarded as indispensable, whether in the smoky city atmosphere or i the open country.

In conclusion, we have to express ou thanks to Mr Davy, the managing directo to Dr Hunter, the medical superintenden and especially to Mr Smith, the clerk o works, for their kind attention in pointin out what was likely to interest us, as well a answering our many inquiries; and we onl hope that the proffered offer of Mr Smith t shew and explain all at any time to visitor who are interested in concrete buildings may not induce those who go for mere pas ime, or from idle curiosity, to intrude too argely on his valuable time.

Farm Engineering.

PHILIP'S PNEUMATIC FIRE EXTINGUISHER.

n article lately given in our columns, e took occasion to allude to the im- ce of farmers insuring against fire, to their produce and buildings are pecu- iable. While we maintain now, as we ined then, that it is the part of every t man to guard against losses by fire uring in a good Office, we do not that this prudent foresight prevents or des the necessity of using means either ke fire an impossibility, or at least a t thing to be set-agoing—or to use ppliances as will enable a fire when to be quickly and certainly extinguished. e contrary the prudent foresight will dictate precautions against by fire in the way of insurance, is ly that element which will urge the man oes this, to use all the means in his to prevent the accidents by which such y be incurred. For it is obvious, that one is insured up to the full value of perty—a circumstance not always met the value so received in cash cannot ly recompense him for his loss. It is erely the pecuniary value of property d by the insurance office which decides s, there are important elements to be ered, which go to make up much more loss in the aggregate, as stoppage daily routine of business, the anxiety res attendant upon the re-habilitation business and the premises, and the nd-and-one inconveniences arising from lden a stoppage of the ordinary rou- f daily work. Hence it is alike terest of the insured and the insurers vent fires; and hence also, that in f the direct interest which farmers have matter, and with which interest alone we have to concern ourselves in this journal, we have again and again advocated the use of preventive means,—those occurring under one or other of the heads of improved building construction, or of special appliances, as fire-engines, steam-pumps, and the like. Under the latter head we have from time to time drawn the attention of our readers to various contrivances, more or less simple; and it is now our duty to do the same to a recent invention, as indicated in the title to this brief paper.

The truth conveyed in the proverb, "a stitch in time saves nine," is in no way so appositely illustrated as in the case of a great fire, of which it may be truly said, that if taken at the beginning, a spoonful of water would have put it out. And it is just in the promptitude with which a fire is dealt with in its first small beginning that its increase to a rapidly-destroying fire is prevented. To ensure this promptitude two things are required—first, a supply of water at hand; and second, a ready means of taking it to the fire and applying it with greater or less force, but with precision and accuracy. It is in securing these two features that the value of the apparatus under notice lies. The water is stored up in a vessel which can at once easily be carried to the fire, and it is so stored up that, without any labour save the turning of a tap, and the directing of a small, and therefore easily handled hose, the water can be directed with force and accuracy of aim against the burning material. The agent employed, as will be seen, is not a chemical one, which requires special preparation, and the supply of which has to be carefully provided for, but is the old-fashioned fire extinguisher—*water*—which is easily had and easily controlled. The force which acts upon the water stored up in the apparatus is compressed air, and this compression is secured by simply, at any leisure time, working a small pump. An exceedingly ingenious, yet very simple, arrangement is adopted, by which the air is prevented from acting on the water in the chamber till it is actually required, and by which there is, therefore, no pressure on the water under ordinary circumstances, and, therefore, no danger of the leakage which would arise from the pressure of the air being always on the water. The pressure of air is sufficient to give a jet 50 feet in height, and this can be set instantaneously on by the mere turning of a tap. We believe this apparatus goes far to solve the difficulties attendant upon the use of portable fire extinguishers, and we shall be glad to see it gain that extensive use to which we believe its merits entitle it.

The Farm.

THE HARVEST OF 1869.

ys a difficult, and, therefore, to a
ponding extent, an unsafe thing
edicate from the results as known
comparatively limited range of
at the general results of a harvest
year may be as regards the king-
e. Hence arise those conflicting
which are met with in such num-
riety on the subject of the har-
believe one writer, all is matter
lation; to believe another, it is
for gloomy anticipations and
; while a third so balances
d the *cons*, so evenly puts on
he doubts and the difficulties,
opes and the pleasing certain-
other, that the claims of both
tion being so carefully balanced,
lt, if not impossible, to ascertain
the opinion of the writer in ques-
ith the data at present before us,
the harvest of this year, while we
look those points connected with
o thoughtful minds, cause some
doubt and anxiety, still we may
he terms of congratulation rather
of consolation and mitigation;
all the more matter for thank-
en we consider that at one
the year, such was the ungenial
onable character of the weather,
grave doubts indeed were ex-
n by those who take a hopeful
a gloomy view of things as they
The unfavourable season in the
May and June did not, however,
y which it was very reasonably
it would, and, rather singularly,
ad less of this unfavourable
England. In Scotland, so far as
are concerned in which the harvest is concluded, it is satisfactory to be able to state that the position of the farmer is fairly good, better than was anticipated; the grain which has been brought to market has shewn that its quality and weight are good, and the general reports of various districts seem to bear out this testimony. In some districts, wheat is above the average, both in quantity and quality; and, although in others the quantity is below the average, the quality is up to or beyond it. Altogether, as regards Scotland, it will be generally conceded that a fair average crop has been obtained.

As regards England, as usual, very conflicting statements are formed; but, taking the information as a whole, which comes from the various districts, we arrive at the conclusion that the wheat crop is under the average, both as regards weight and quality; but, on the other hand, the barley crop is good, both in quantity and quality; while the oat crop has turned out better than was at one time anticipated.

As regards Ireland, we have as yet no full and trustworthy data to found an opinion upon; although the probability is, that the results there of the harvest will be somewhat similar to those experienced in Scotland; this is the probability—the certainty is, that there has been less acreage under wheat this year than in that preceding, which, being of considerable amount, will tell in measure upon the general results.

As regards the root and forage crops, it is eminently satisfactory to have to report a vastly different state of things than that which prevailed over so many and such wide districts last year, especially in the south. We went over extensive districts last year, and renewed our visits this year, and very marked and gratifying was the change in the appearance of the land under green crops. The rains came most timely, and cannot fail to have had a most favourable influence on the quality and quantity of the roots which then remained to be harvested. And the same rains which acted so beneficially upon the root crops acted similarly upon the forage crops. Pastures were wonderfully the better for it, and will tell on the right side of the farmer's books, when, with advanced and advancing prices for stock, he can look forward with reasonable hope to having an abundance of food for them.

One thing all agree upon, in connexion with the harvest of this year is, that finer weather for securing the grain crop could not have been had. Over a very large breadth of land the whole produce of the fields has been housed without being subjected to a drop of rain. This is, in itself, an immense advantage, and goes far to make compensation for the deficiencies in quantity and quality where these exist; for what has been so well secured will not deteriorate, as would grain put up in a condition not so satisfactory. But if things have always their good side, it is the fate of things connected with humanity to have their bad ones sometimes. Hence it is that the great good of having secured the corn in a thoroughly dry and sound condition, has, in many cases, brought with it the evil of putting the corn in that state in which, with great sunheat, it is liable to take fire in itself; or, if this be disputed, as by some it is disputed, it is brought into that condition in which fire is exceedingly apt to spread with rapid a disastrous strides, when, through accident design, fire is applied to it. Certain it is, wha ever the causes may have been, that the have been an unusual number of fires i stackyards this season. In view of th readiness with which stackyards take fire, an the difficulties attendant upon their exti guishing when once set agoing, it is, to say th least, but the exercise of the most commo prudence to take care that, although fire cannot be prevented, still, their disastrous re sults may be lessened and mitigated. An that this may be done is patent enoug when we consider the facilities offered fo *insuring* farm property; that this should b neglected in any case, one would have—tak ing the common sense view of the matter— difficulty to believe; that it is neglected in s many cases, although with danger surroundin them on almost every side, is one of the feature of farming business, the existence of which i is difficult to account for. Let us hope that with the evidences of increased disasters b fire, and of the increasing liabilities to which farm produce is subjected, which every day surround us, that there will be an increased desire on the part of farmers to avail themselves of those facilities by which they may secure themselves from loss if losses happen; and more than that, secure that tranquillity of mind which arises from the consciousness that no reasonable means have been neglected of lessening the virulence of disasters which may happen at any moment.

* * *

THE AUTUMN WORKING OF LAND.

THAT amidst the fine examples of careful and clean farming which, we are proud to say, exists in considerable numbers amongst us, there are examples of an opposite character, in which the land is foul with weeds to an extraordinary degree, is matter of painful certainty. In such cases, weeds (and in the case of strong lands we refer here specially to the "couch" or "twitch" grass), seem to be considered a necessity of the circumstances, which may be deplored, but cannot be prevented. That this is by no means an accurate view of the case, farms which at one time in the possession of those who so believed foul land to be a necessity, under better management have been entirely rid of the pest, and are so maintained from year to year under crops without the necessity of a fallow.

ere this can be done once, it can be done in, more especially where it has been done circumstances by no means highly favour- e to success; and that it ought to be done assuredly the truth, when we know that ing it would ensure better farming and finer ps. This year, in many districts, is speci- y marked out for carrying on successful tumn working of wheat stubbles, especially heavy land. The crops have been cleared an early date from the land, the weather s been fine, with high temperature, and ny days of cloudless skies, circumstances ghly favourable to the killing, at least to the akening of the vitality, of the weeds. here the land, therefore, has not been rned over, no time should be lost in doing . If the whole breadth cannot be over- ken, let a portion at least be taken in hand; ly so much as will enable what is taken to be thoroughly well done: for autumn working, as in many other ings, half-done work is only time and oney thrown away, at least largely so. y taking what can be well done only at a me, the work of bringing the land into od condition may take a little longer me, but it will be sure to be well done. It the opinion of a very eminent practical rmer, that any farm, however bad its condi- on may be as regards weeds, and specially e couch or twitch, may be brought into oroughly good condition in four, but at the test, eight years. If the power at the com- and of the farmer does not admit of his dertaking, in the first instance, all his ubble for autumn culivation, the remainder ll be done in the usual way in spring, in ne for the succeeding root crop. And it is e capability to undertake the turning up of e autumn stubble to a very much larger tent than is capable of being done by rse-power that the value of the steam- ough lies. Indeed, some maintain that, ith the exigencies of farm labour, under ual circumstances in the autumn, working e land by horse-power at that season can- t be done, or at all events, properly done.

As regards the best kind of implement by hich the stubbles are to be worked, it seems be admitted by nearly all practical men, that the grubber or scarifier is the best. Of the implements of this class we are inclined to recommend Biddell's scarifier; we have seen it tried under circumstances so trying that no other implement could work at all where it worked well. To take advantage of an early harvest, and to allow the action of the hot sun upon the weeds, a little management of the labour is required. On the supposition that horse labour is used on the farm, it is necessary to economise this as much as possible; the wheat should, therefore, be cut, but not carted till so much of the grubbing work has been done. In stooking it in the field, the stooks should be arranged at such distances as will enable the grubber to go to work. In some cases it will be necessary to send the plough in, in the usual way, following with the scarifier; but, whereever practicable, the grubber should begin the work. In heavy land much infested with weeds, two turns of the grubber will be required. In the first turn the narrow lines, or points, should be used; in the second, the broad spaces, or hoes. By these two workings the soil is well broken up, and the weeds brought to the surface, the desirable result which the plough will not, as a rule, bring about. Indeed, in land which has long been neglected, and in the foul, shamefully foul, condition in which, in some districts, we see it, a third grubbing may be necessary; if so, this should be given in a direction at right angles to the two first. The land thus broken up may be allowed to lie a short time, say till a shower comes, after which it should be harrowed, and the weeds collected and burnt; the more carefully the collection is made the better. In this brief article we can only glance at some of the points connected with this important subject; it is one, however, which admits of, if not of much being said about it, at least of much that may be urged in favour of it. If it did nothing else than bring the weeds under something like management, it would be worth doing; but it does more than this: it places the soil in that condition in which the atmospheric action can go on, and bring it into that fine tilth which gives the finest soil and the largest root crops.

DEEP CULTURE OF THE SOIL.

THE departments of farming are numerous in which there exists a wide diversity of opinion; probably it would be the most correct way to put the point to say, that in all departments of farming this diversity exists. To those who know what the science as well as the practice of farming is, this diversity is easily accounted for, and is no more to be set against farming as a science, than is the diversity of practice amongst medical men to be set against their science. Circumstances alter cases, is a trite saying, and it is just because the circumstances of farming—as those of soil, climate, and locality—vary, that its practice varies so much. At the same time it may be said, that in some departments of farming diversity of opinion exists, not on account of such circumstances as stated above, but rather from a misunderstanding on the part of those disagreeing as to what constitutes the real facts of the case. It appears to us, as a very likely thing, that the diversity of opinion, for example, which exists on the subject of deep culture of the soil, arises from a want of knowledge of what it really is, and what office it proposes to perform in farming economy. The majority of farmers are firm in the belief that a pulverised condition is the best for a soil to be in, although, by the way, it may be here remarked, that the belief is not always acted upon in their daily practice of farming. But opinion is by no means so uniform as to how far this pulverised condition should be secured, or rather, to what depth the pulverised soil should extend. Some are much afraid of having it too deep, because, say they, its soluble portions, and of the manure which may be given to it, will be washed out and carried off to the drains. Those who hold this opinion forget, overlook, or are ignorant of the facts connected with the absorptive power of soils, by virtue of which it takes up and retains the valuable constituents. But, further, it is well established that this absorptive power is increased by the action of the atmosphere upon the soil. This is one reason why the soil should be so pulverised as to admit of this atmospheric action. Another is in the fact, also well established, that unless the solution, which is the result of the action of the atmosphere and the soil upon the manures, passed into the latter, has a thoroughly free access to all parts of it, the absorptive action is reduced in force. The objection, then, to which we have alluded, appears, by these facts, to be got rid of. But the question remains, how far should the depth of pulverised soil be, in relation to the necessities of the plants which are to grow in it. This question is not so easily answered; all we can say is, that the plants have a tendency to push their roots into the soil to a much greater distance than is permitted them under ordinary circumstances; and if this is the tendency, then it is a natural one, and should be encouraged. And we can easily overcome what difficulty there is in the answer to the question, what is the depth we should give of soil into which the plants can send their roots, by going as deeply as we economically can, and simply allow the plants to choose for themselves what depth of this they will take—their choice, depend upon it, will be a wise one, being regulated by a wise law.

But there is still another objection to deep culture of the soil, and that is, that the bringing up of the subsoil is highly prejudicial to the plants. On this point we can best serve the purpose of this paper by extracting here what Mr Stephens, the historian of the Yester Deep Land Culture has to say upon it. "Most people," says this eminent agriculturist, "who have witnessed this subsoil trench ploughing on the Yester farms, believe that the mixing of the surface with what appeared to them a full parti-coloured subsoil would poison the surface soil for the future; and, on this supposition, a very general prejudice has been raised against the

ion amongst farmers. Such apprehen-
might reasonably be entertained in
ng up a large portion of subsoil in
ined land prior to the sowing of a white
but retaining such an apprehension
it the subsoil of thoroughly drained land
roper period of the rotation—namely,
to a grain crop — is mere prejudice,
se it is not sanctioned by experience.
ie contrary, experience has proved the
uous state of the subsoil in those con-
is. For two seasons the young grass
ed to suffer on Yester Mains, and the
was ascribed by the workmen, in con-
ice with the common prejudice, to too
a proportion of the subsoil being brought
once; but, in reality, it was rather to be
ed in both seasons to the want of time
hould be allowed for assimilation of the
id subsoil, and also in a great degree to the
of a sufficient quantity of manure. The
hension of injury arising from a bad sub-
more prevalent in England than Scotland,
ie feeling has certainly been engendered
maintained by the injudicious employ-
of undrained land. Where any iron
in the subsoil of undrained land, it is
state of a protoxide, which is soluble
ter, and is always injurious to vegeta-
but wherever land is thoroughly drained,
otoxide is converted into peroxide by
ction of the air, and, being insoluble in
, is rendered innocuous to vegetation."
hus see that one essential element to
ss in deep culture is drainage, and it is
sential element to success in all farming
tions whatever, and therefore cannot
against deep culture as an objection to
ng it out.

have stated that public opinion
no means in a settled position yet,
the question of deep culture, and
ier it is advantageous or not. A
party maintains that it is impera-
necessary if we wish to increase
roductiveness of our soils; another
ains, that while in some respects the
n brings advantages, it also brings
r with it. It seems to us that much of
versity—nay, up to a certain point, the
whole of it, arises from a misunders
what the term actually means.
believe that almost every farmer
that it will be beneficial to the pla
subsoil beneath is opened up or
that the roots can find an easy pas
it, and extend themselves to t
their habits may require. Here th
of the subsoil is not altered, its
only is affected, and up to this
agree, and the result obtained ma
"*deep stirring.*" But when some
and say, not only should we stir
and alter its condition, but it is nec
to raise it to the surface and alter it
this, which we may call "deep cult
agreed to by all. And it is in th
divergency of opinion arises; and
many agree as to the benefit of s
subsoil, they think that bringing
mixing it with the surface soil is
upon the various points here in
have already said somewhat in
article.

We now proceed to describe brief
conceive to be one of the most im
not the most important mode of ca
deep culture yet introduced—nar
known as the "Yester deep land
introduced by the Marquis of T
to whom the agricultural commu
deeply indebted for many improv
practical farming.

The system is carried out by me
implements—the "Tweeddale ploug
a depth of 13 inches, and the "sub
plough" following, and taking an
depth of 6 inches. The depth of
thus fully obtained by the operati
two implements, is not obtained
ripping or tearing of the subsoil m
is a thorough and complete mixing
the upper soil.

The plough resembles, in its gener
ment and construction of parts, th
swing plough, only greater strengt
to the parts. But the great featu
Tweeddale plough is the mould b
peculiar lines or contour of which w
out by a long and patiently carried

of experiments on a large scale. The mould-board thus described "allows four horses to draw the plough through soil of the same description, at the depth of 15 inches, with as much ease to men and horses as the common plough is drawn at the depth of 10 inches with two horses. The secret of the matter seems to be, that the improved mould-board, instead of pressing against the furrow slice, separates it at once from the land-side with its breast, which is the only point of resistance, and causes it to slip along a straight inclined plane from the point of the sock to the ear of the mould-board, on reaching which it falls away by its own gravity. Friction against the mould-board is thus in great measure avoided." But the furrow slice is not turned over in an entire form, but only partially so, and at the same time broken up, so that it is presented to the ameliorating influences of the atmosphere, in the best possible form and position. The plough thus obtained was shewn capable of going to a greater depth than that which it usually gives, 13 to 15 inches, by the aid of increased or steam-power, but the Marquis did not think it prudent to use it to a greater depth, inasmuch, as he feared the effect of bringing up too much of the subsoil to the surface. His aim was rather to bring up a portion only, and to secure the thorough mixing of that with the good surface soil. These points he obtained by following up the action of the plough we have just described, with a subsoil plough. This is a modification of Reed's subsoil plough, and is provided with a vertical stem, to which the sock is secured. This sock is double feathered, tapering from a breadth at the front of 2 inches less than the width of furrow made by the plough, to a breadth at the back of 2 inches wider than the furrow. The whole length of the sock is 22 or 24 inches. It does not lie flat on the ground, but the heel is raised up to a height of 1½ inch above the point. The tapered edges of the sock are made up by two steel plates, some 3 inches broad, which are riveted to the sock. To the end of the sock an inclined tail is fitted, its length being 16 inches, and breadth 8 inches, and its angle of elevation being such that its termination is 8 inches above the point. "The immediate effect of the broad-feathered sock operating upon the soil, is to cut the furrow sole smooth and entirely flat, at least 19 inches below the surface, the loose subsoil raised from it is carried along the sock in an inclined plane in an upward direction, to bring it within reach of the surface soil. When it has reached the top of the inclined plane by which it has been elevated 8 inches above the bottom furrow, it falls over its ends and sides, bringing in its fall a portion of the surface soil, and both are commixed before reaching the bottom of the furrow to fill up the void continually forming under the inclined plane, or tail-board, in its passage through the subsoil." Mr Stephens, the able historian of the "Yester Deep Culture" system, states, in the work defending the system (published by Blackwood & Sons, Edinburgh), that the mixture of the soil and subsoil thus made is better than that effected by means of the spade, and the reason, he says, is easily given. "The subsoil trench-plough raises up a portion of the subsoil by degrees, and rubs it against a corresponding portion of the upper soil, laid over in the furrow-slice by the plough that has gone before; and on the subsoil losing the support of the inclined plane of the subsoil trench-plough, both sorts of soil fall together over the ends and sides of the incline upon the bottom furrow, whereas, when soils are mixed in trenching by men with the spade, masses in spadefuls are placed together side by side, and not in numerable small portions of mixed loose mould. A great difference exists between a mixture of spadefuls and that of loose mould."

There can be no doubt whatever that the system of culture in which the two implements just described are used, has raised the lands on which it has been tried from a wretchedly low to a remarkably high value; and there is also no doubt that the implements are possibly the best of their kind in the soils there met with. It is, however, we think, open to doubt whether they will be applicable, ut modification, to all soils. We have made acquainted with one case, where, close retentive clay, the action was by ans satisfactory. In alluvial and loamy we have no doubt of their utility, be- the grinding or abrasing action of the f the subsoiler, as above described, would be secured. But in close adhesive clays we fear this would not be so easily, if in certain classes at all, obtained. And, as will have been noticed, the mixing of the subsoil with the surface soil is dependent upon this peculiar action. We should like to see this system tried on a variety of soils.

THE FUTURE OF STEAM CULTIVATION.

gathering up the results of what may be called retrospective notes upon the ect of steam cultivation, it cannot fail trike the observant mind that the most arkable of these results is the positive dity with which it has been practically ied out. It has long been the practice a certain, and, we regret to say, a large influential class of the community, to racterise the farming community as that ion of the body politic which exemplifies slowness with which new ideas inter-pene- e and influence the practice of every-day ings. Now, so far as real experience goes, reverse of this is the case. We might eal to sundry departments in the history griculture in its modern development, in f of this; but we have only, and in this e very appropriately, to refer to that nected with the history of steam cul- tion. Now, in looking back, it may said that it is a long period of time e steam cultivation was proposed, and ally, after a fashion, carried out. But the od, although apparently long, is in fact short. For, as we have said, that it was after a fashion that its practice was at- pted to be realised, and that fashion was by neans a perfect one. But so soon as the em was taken up by thoroughly practical , practical in the double and important se of being not only sound mechanicians good business men—so soon as to be al- t coincident in point of time, did the ing community turn their attention to the system as an aid to their labour in the field; and so marked was the influence of that attention, that very rapidly the making of steam cultivating machinery became a most important branch of our home manufactures, and this has gone on so steadily and strongly that the "trade" has reached dimensions which it would have been considered very Utopian some twelve or fifteen years ago to have predicated. And all this has been done so quietly and unobtrusively, that those of the detractive school, always eager to get what is called, if not elegantly yet graphically, "a dig in the ribs" at farmer Bull, have really no idea of the vast strides which scientific farming has of late taken, and, therefore, still speak of it in terms, if not of the most unfounded contempt, of unmistakeable indifference and contempt, arising from the grossest ignorance of the facts of the case.

And yet, although the triumphs of steam cultivation have been most gratifying in one sense, in another they have not been so great as might have been anticipated, certainly not so great as some have anticipated. As yet steam cultivation is the exception, horse cultivation the rule. And if we take the term cultivation to include a range of duties or work far more extensive than mere ploughing or stirring the soil, we shall at once perceive that steam has, so to say, but touched the outer hem of the subject, and, so far from having invaded the whole realm of farm work, has but as yet only invested a very small portion of it. Even in the limited direction of ploughing, or otherwise preparing the soil for the reception of crops, the steam-engine has done comparatively little. On the large scale it has unquestionably done wonders; but it has not yet offered itself as available for small farms. Costly, and to a large extent cumbersome, it appeals, if not altogether, yet chiefly, to the man of large possessions and well-filled purse, and much has yet to be done before it can present itself as capable of being utilized by him who farms limited surfaces, and has, or is presumed to have, therefore, limited means. But, if by the term "cultivation" we mean the whole range of operations upon a farm—which the term cultivation properly and logically does include—then we may fall back upon what we have already said, and maintain what is easily enough to be maintained, that the steam-engine has not as yet fulfilled, in anything like a complete way, its mission of usefulness. For what in reality are the operations which the practice of cultivation in its widest and truest sense involves? Certainly a much wider range than many deem to be the case. Assuredly the work does not stop at the ploughing of the soil, if indeed the work *begins* there. Does it not begin, or should it not begin, with the carting of the manure on to the land, if not even before this, in the preparation of the land itself, so as to make its peculiarities precisely those which will best aid the work of the steam-engine in the later stages of cleaning the crops, and the final one of reaping them? Here, in these last words, are indications of other directions in which t steam-engine could be made useful; and i all these which we have above alluded t the most far-seeing of practical men belie that the steam-engine is yet to be utilize before it can make good its claim to havin done for the farm all that it can do.

If, then, this wide, and certainly not to wide, range of duties has still to be unde taken by the steam-engine, the questio comes up, how is this to be brought about While by no means acceding to the view tha our agricultural societies are the only in fluences which can be brought to work i realising this further extension of the art o steam cultivation, still it is unquestionably th fact that they have great influence. Th question is, will they exert it, and that quickly Let us express the hope that the apathy wit which they have in years gone by viewed th progress of agriculture engineering, may no be here exercised. In other things—shall w say in many other things?—they have bee over-anticipated by the farmers, and Societie have in fact lagged behind in the race of progress in place of having taken the lead. Le us hope that more enlarged views of the probable future of the steam-engine will be take up by them, which, if done, will lead to thei offering every facility, and presenting ever inducement in their power to those who are at present only waiting to be urged to go on that path which will lead to greater work than the steam-engine has yet done for the farm, great as that has certainly been.

[illegible]

M[illegible] laying out irrigated meadows, known by various names—as the "float," the "bed work," and the "ridge" system. In this the land is raised in a succession of ridges as in fig. 1 in opposite page.

along the ridge *a* of each elevated part, a ditch or open furrow is made, and another ditch in the bottom *b* between two of the ridges. The water overflows the drains *aa*, and runs down the inclined sides *a b a* of the ridges in a thin stream, where it is caught up by the drains *b b*. The diagram

2 will better illustrate the distri- . *a a* be the river, canal, or channel of ', communicating with the main carrier ' means of a channel *b c*, controlled by :e *d*. The water passes from *b b* to the carriers *e e*, placed at the apexes of lges, and corresponding to the points 1 fig. 1. These have a gentle fall from)per end *e* to the lower end *e'*, as from *a* 1 fig. 3, by being made 6 inches deeper at nd *b* than at *a*. The water is shed from arriers over this side of the ridges, and is it up by the drains *b b*, corresponding to fig. 1. These drains *f f* take the water ower carrier, *g g*, by which it is led off the meadow and delivered to the row ice of outfall. Or, the carrier *g g* may ly a second plot of land at a lower level, hich in the diagram *h h* may indicate upper carriers, and *i i* the drains. In 3, *c* corresponds to the carrier *g g* in fig. 2, fig. 3 being the second plot under irriga-

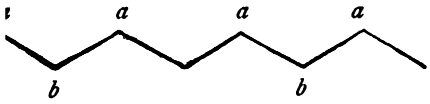


Fig. 1.

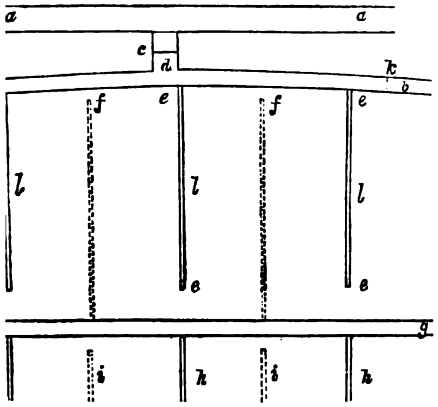


Fig. 2.

The diagram shewn in fig. 2 may re- ent only a few of the ridges. By placing es at the points *k k* the water may be ned to three of the carriers *e e;* and placing small stops or sluices at any t in the carriers *e e* as in *l l*, part of the ridges may be irrigated. The small stops or sluices are generally made of pieces of turf. The whole width of the ridges, as from *a* to *b*, fig. 1, is from 9 to 10 yards, and the slope from *a* to *b* from 13 to 14 inches, or a rise of about 1 inch to every foot of breadth. The carriers *e e*, fig. 2, are not of uniform breadth, but are widest at the ends where they communicate with the channel of supply, *b b*, and taper off gradually to the lower end *e;* the width at the upper end *e*, is 24 inches, and at the lower end *e*, 18 inches. This construction causes the water to rise in the carriers, and to overflow their edges. The depth of the carriers should not be made too great, 10 to 12 inches will be quite sufficient; a shallow carrier of 6 inches will obviously shed as much water over the sloping surfaces of the ridges, as a deep one of 6 feet, both carriers being supposed to be kept quite full. The drains *f f*, fig. 2, are made to taper in their width, but in the opposite direction to that of the carriers, that is, they are widest at their lower ends, where they deliver the water to the carriers *g g*, fig. 2, and narrower at their upper end. The width of the main channel of supply *b b*, fig. 2, may be 4 feet; the size of sluice *d*, 2 feet wide by 3 feet 9 inches deep. If drawn up 2½ feet, an opening of 5 square feet will be given, through which 10 cubic feet per second, or 560 tons an hour will be poured, supposing the rate of flow to be at the rate of 2 feet in a second.

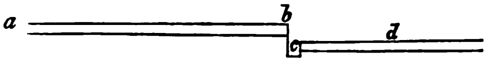


Fig. 3.

We now describe the third mode of irrigating land, known as the Bickford system, from the name of its inventor. This is a simple, yet efficient method of conducting water over lands, whether of even or undulating surface. In a communication to the *Journal of the Royal Agricultural Society of England*, Sir Stafford Northcote described the peculiarities of the system, from which we derive the following particulars:—

> Along the line of the highest ground a carriage gutter is cut, about 12 inches broad and 6 deep, these

gradually diminishing as the gutter approaches its termination, till at last it merges into the ground. On this gutter becoming filled, the water overflows, and were the slope of the land below uniform over all its surface, it would shed uniformly over it; but the inequalities in the land prevent this causing it to flow in streams over the lowest parts. To obviate this, subsidiary or smaller gutters are cut in the same direction as the main carrier gutter, but level throughout their length. The watershed from the carriage gutter is caught by the subsidiary one till it fills, and in turn overflows, shedding the water over the land between it and the next subsidiary gutter in succession; this having, as the other one, no fall throughout its length, also fills, and in turn overflows, shedding the water over the land between it and the next gutter. This is continued till the water finally reaches the drain at the bottom of the field. The method by which these catch waters, or subsidiary gutters, are formed level throughout their length, or nearly so, forms, from its simplicity and effectiveness, the peculiar feature of Mr Bickford's system.

In laying out these catches, the spirit level is set aside, and a simple instrument substituted. Two rods are joined at one end, and fixed at an angle, so as to place the feet 4 feet apart; between these a cross piece is fixed, with its centre marked by a notch; from the apex of the triangle is hung a card, from which a ball is suspended. When the instrument is placed on the ground, and the card crosses the notch in the cross piece, the two feet stand on the same level. The workman places one foot of the instrum on the ground, and on this, as a point, turns t instrument round, as he would a pair of compass and continues to place and replace the other leg, un he finds that both stand on the same level. Marki the position which the first or pivot leg occupied, l uses the second leg as the next pivot, and proceeds before, until he finds a spot on which the other l resting, places both legs on the same level. Obtai ing thus a series of markings, he by this means trac out a level line throughout the field, and finally, b means of a plough invented for the purpose, cuts ou on the line thus indicated, a gutter 4 inches wide, an the same number of inches deep. At points where is impossible to obtain a level, a step is put in th gutter, and a fresh level taken for the continuatio On the supposition that the water employed for irriga tion contains fertilizing matter in suspension, it i evident that, in the plan just described, the upper pa would receive most of this matter, the second a le portion, and the third the least; to obviate this diffi culty, cross feeders are made, connecting the mai gutter with the subsidiary one below it, and this wit the succeeding gutter, and so on. By a simple syste of stops, the water from the main source can be passe to any one of the gutters without being shed over th intervening land. Sir Stafford Northcote estimate that the cost of irrigating land similar to his own where the system has been carried out, would no exceed £1 per acre, the annual expense of cuttin new gutters by the side of the old ones being 1s. pe acre.

NEW SYSTEM OF MANURING CROPS.

[Continued.]

WE now come to the other elements of organic substances, the first of which is oxygen, the origin of which, and that of hydrogen, is water. The plants receive, through the agency of rain, more of them than hey can use.

The origin of nitrogen in plants is one of ne problems of the first order in agriculture, it has given place to some of the warmest ontroversies. The question is, do the plants ake their nitrogen from the atmospheric air, om the ammonia and nitric acid which water contracts in the ground, or shall we pply it in manure?

This question has passed through many hases before being solved. One of the men ho has occupied himself most with it, the celebrated German chemist, Liebig, has pu forth, at different periods, opinions which it ha been difficult to reconcile with one another Thus, in his "Chemistry applied to Physio logy and to Agriculture," Liebig writes:— "That the production of nitrogenous matter increase in plants according to the quantit of ammonia which is supplied to them in animal manure." Implicitly, then, Liebig recognises, if not the necessity, at least the use of nitrogenized manure.

Further on, struck by the considerable quantities of nitrogen found in the ground, Liebig goes back upon his first opinion, and declares that the quantity of nitrogen which is derived from manure has no influence upon its value. But facts proving the effica-ess of nitrogenous manure accumulating, ; could not deny them, but sought to n them by the properties that nitro- d combinations possessed of dissolving phosphates. Here is what he says in urth Letter upon Modern Agriculture:— know no other way which phosphates e spread in the ground, except by water ed with carbonic acid; and if it is true ne of the principal effects produced by re, or by decomposed organic matters ground in manure, providing what in selves are true sources of carbonic acid, enriches the air by this acid, which rates the soil, and the water which irri- it; if it is the case that this water, charged carbonic acid, renders the earthy phos- s soluble and spreads them in the d after having dissolved them, then is no doubt that the ammoniacal salts do ossess the property of being able to ce them (the organic matters) in same end, and have not such a influence upon the growth as they." h does not prevent Baron Liebig giving, nother work, this fact:—"The great ity of nitrogen which rain yields to the ." This fact justifies the assertion that estoration of nitrogen ought to pre- y the agriculturist less than that of nic acid. However, in the first volume e same work, he recalls, page 54, that s always "strongly recommended the lturist to preserve, with the greatest the ammonia contained in stable dung, o avoid all loss, considering that many s depend upon ammonia, necessary for ncombustibles, or mineral elements of re, exercising their action altogether. experience of Boussingault, of Lawes Gilbert, and of George Ville, have put us clearly the efficacy of manure in nitrogenized combinations are to be .

e sixteenth volume of the *Journal of the Agricultural Society of England*, con- a great number of experiments tried by s and Gilbert. For more than ten they studied the cultivation of grain in improved by mineral principles, and with ammonia salts only; and with these two substances united; in short, by way of comparison, they cultivated, also, fields which had received no manure. Whilst the ground improved exclusively by mineral substances, gave only a very small predominance over the produce from the unimproved field, those which had got the ammoniacal salts shewed a notable increase, surpassed in addition by the use of azoted and mineral manure.

The experiments of MM. Boussingault and George Ville are all as conclusive.

In 1866, I established a field for experimenting, with the view of establishing my views. I planted potatoes in equal divisions of a field, the soil of which was uniform, and manured respectively with farm manure, crushed and putrified potatoes, ashes in an equal quantity with the potatoes, the same ashes to which I had added sulphate of ammonia. A plot without manure was established, so as to enable me to make comparisons. The produce of the squares which had received for manure the farm dung, putrified potatoes, ashes of potatoes, and sulphate of ammonia, was apparently the same. That of the part which had been improved with ashes alone scarcely surpassed that of the field which had received nothing.

My experiments had a twofold result. They shewed, at the time, the efficaciousness of nitrogenized manure and the usefulness of carbonated materials; then the squares manured with the ashes of potatoes, and some of the sulphate of ammonia, produced as much as that which we had manured with putrified potatoes.

Thus, as we shall see further on, that without giving an absolute value to the nitrogen, and neglecting other fertilizing materials, the value of this body cannot be disputed. But is it the nitrogen of the crop which provides the nitrogen in the manure? No; analysis shews a great surplus of the first over the second: it is necessary, then, that the plants should get it from some other source. This source would be ammonia, the nitric acid which water draws from the earth; perhaps even the plants will absorb the ammoniacal vapours spread abroad in the air.

Certain plants do not appear to be advantageously influenced by ammonia and nitric acid—we speak of peas and clover. It will then be in a state of gaseous nitrogen that they will absorb it. The experiments of M. George Ville will seem to prove, contrary to M. Boussingault, that the position of matters is really thus.

The form under which nitrogen is found is not without influence upon its efficiency. Thus, ammonia seems better fitted for wheat and rape, nitrates for beet-roots.

We have already seen that the organic elements (1), and the mineral elements (2), fashion the vegetable tissues in very unequal proportions. The organic elements form, in the average, nine-tenths of the whole.

We shall be much mistaken, however, if we judge by the small proportion of mineral elements, of their small importance. Experience shews, in the most evident way, that they are absolutely necessary to the normal development of the plant.

Mineral matters are equally indispensable to the composition of animal tissues, the nervous system, the muscles, and the blood being derived from phosphorous produce. The bones are formed principally of phosphate and carbonate of lime, of phosphate and magnesia.

And, remarkable to say, chemical analysis shews that there is in the plant a fixed and invariable accordance between the nitrogenous principles and the phosphorus of one part, and the potash of another part; as if nature had wished to prevent troubles which would not have lost the chance of shewing themselves in animals, if this accordance had the power of being casually broken up.

Having admitted, then, that the plant derives carbon, oxygen, and hydrogen from the air and water, nitrogen from the air and ground, we ought to be able, in this case, to determine easily, by means of chemical analysis, the elements which are lost in the soil, and those consequently, which we ought to put into it, to obtain the highes conditions of fertility possible. Well, w have, believed so, and have found ourselve mistaken.

We have already seen that it is not sufficient to know that an element is met with i the soil: it is necessary, also, to know if th state under which it is found there permits o its assimilation by the plants; it is well to kno that, in this direction, up to this, chemistry ha remained powerless. Thus, Liebig, in certai analysis, has given the enormous number o 55,000 kil. of nitrogen to the hectare. Boussingault, having analyzed a sample of soil a Liebfrauserburg, found in the hectare, a the depth of 33 centimetres, 11,310 kil of nitrogen.

M. George Ville, on his side, has found after his analysis, that the soil of Vincennes contained phosphoric acid, 1797 kil.; potash 2301 kil.; chalk, 39,365 kil. Now, if w grow wheat upon this soil for four successive years, giving it only nitrogenized matter the crop gives no more the fourth year tha from 5 to 6 hectolitres.

The soil, says M. George Ville, has grea poverty in mineral matters, and these fou crops have raised the ground only to:—Phosphoric acid, 85 kil.; potash, 92 kil.; chalk 40 kil.

We say, in passing, that these facts hel much to explain the good effects of fallowin land, and the phases which it gives to the soil Really inert principles can very well, unde the influence of the air, &c., modify them selves, being transformed and passing int a state which may be an effective stat Therefore, if we wish to find out what a so contains, and what is defective in it, it i necessary to follow the directions given b M. George Ville, asking, in one word, th opinion of the plants we wish to cultivate. Suppose, says M. George Ville (1), two parts of th same manured land, the one having complet manure, the other having manure from whic has been excluded, purposely, the phosphat of chalk and potash, is it not evident, th if the crops succeed, that the soil contain naturally, potash and phosphate of chal which are assimilable? It is needful to r lso, that when M. George Ville speaks riments made in solid soil, he intends plete manure only, the reunion of the g principles :—Nitrogenized matter, ates, potash, chalk. Because, what s the other elements is not of il, however poor it be, which ot contain sufficient quantities of

n the contrary, we wish to study the of manure upon artificial soil, contain- ly mechanical elements — calcined or example—it is necessary, to have te manure, to add four substances, we will name immediately, the other ts which analysis draws from vegetable .

resume, what alludes to the sources hich the nutritive elements of vege- are derived, we state — 1. That car- erives carbonic acid from the air, and which is in consequence of organic matters being decomposed in the soil; 2. That oxygen and hydrogen are given from water; 3. That nitrogen is partly from the air and partly from the soil; 4. That most vegetables seem to absorb it in the form of ammonia and nitric acid; but that leguminous plants seem to take it in the form of gaseous nitrogen.

Experience has shewn that it is by no means necessary to carry carbon, oxygen, and hydrogen to the soil. That although the constant excess of nitrogen of the crop over the nitrogen of the manure shews that vegetables derive it in other ways than from the manure, it is necessary to add it to it so as to get good crops. That, what concerns the mineral elements, chiefly phosphates, potash, and chalk, it is a necessity to follow the laws of restitution, if we do not wish to see the ground barren.

LIEBIG ON FARM-YARD MANURE.

ERE is no subject which carries with it so much of practical import- s that of farm-yard manure, or to use ss euphonistic, if more graphic phrase, ard dung. To understand in the fullest le way all that can be learned as to its tuents, and then its action in the soil pon the plants—how it increases the ce of these, how much manure any field produce may be expected to yield, and at condition, after a series of years, a an be restored by farm-yard manuring, all questions of the highest importance, ich it is the best interest of the practical that he give earnest attention. That se points the grossest ignorance exists e minds of many, and a more partial till dangerous extent of ignorance in the minds of some, while a thorough edge of the points involved in them is held by but few, is patent enough to all who have taken the subject into earnest consideration. A correspondence which we had with the eminent agricultural *savan*, Baron Liebig, to whom the science is so deeply indebted for researches and writings of the highest value, has resulted in our opinion, that from what he has devoted to the world, but to which comparatively little attention has been devoted, from various causes, by practical men in this country, a vast deal of high practical worth can be obtained. We believe, therefore, that we shall be doing our readers a service, by drawing their attention to what Baron Liebig has said upon the subject, in a series of articles, which will have a much wider circle of readers amongst English farmers, than the medium through which they were originally offered to the public.

Farm-yard manure has been called, and in many senses justly and correctly so, the universal fertiliser, applicable to all soils and crops; and so applicable, because it contains, under every circumstance, those constituents which are drained from the soil by various crops, and are useful to them when again returned to the soil. The constituents are all present, although they may and are in varying quantities; but being there, the result is that the application of farm-yard dung is beneficial to plants. As it never fails in producing certain results, and those, as said above, beneficial ones, the farmer in many instances continues to use it without questioning whether he could not devise some means equally efficacious, yet more economical. Nor does he consider that the notion—that the action of manures is in proportion to the quantities of it which he employs—is an erroneous one, a notion which results in urging him to use altogether too large quantities of it, so that all beyond a certain limit is simply thrown away. Let us see how these two points are established. In the first place, Liebig points out that it is necessary to remember that the exhaustion of a field is brought about by the crops withdrawing a certain amount of nutritive constituents, leaving, of course, in the soil a less amount of them for the crops which succeed. But the loss of each individual constituent has not the same effect upon the exhaustion of the soil. If, for example, a plant is grown which does not require much lime, it does not matter to this particular plant whether the soil is deficient in lime. If the soil is largely provided with any constituent, this is drawn upon by the crops, to such a small extent—see the analysis of any crop as evidence how small, comparatively, is the amount withdrawn from the soil, that the loss of this constituent has [illegible] effect upon the large store of it, that it is scarcely, if at all appreciable, from one rotation to the other. Nevertheless, we know, as one of the results of practice, that the crops do decrease from one rotation to another; hence the necessity to manure the land if we wish to keep the crops up to the standard. And the fertilising effect is to be attributed to the manure giving back to the soil those nutritive constituent which it contained in the least proportion and which, as a consequence, lost by the actio of the preceding crops comparatively th largest fraction. This will be at once seen whe we consider that, in a field abundantly supplied with lime, no fertility would be restore to this field, otherwise exhausted, by supplyin lime, but by supplying those other constituents in which it was deficient.

But as the strength of any machine is indicated or decided by the weakest part of it so is it true, that it is by the minimum of on or of several constituents contained in th soil, that the fertility of the crop is governed For it is true, that every field contains a minimum of one or several constituents, as also maximum of one or several substances. Thus if lime is the minimum constituent, the produce of plants, as corn and turnips, or clover will not be increased by the actual addition to the soil of any supply of other constituents as potash, phosphoric acid, &c., to that of those constituents already in the soil; but the produce will be at once increased by the simple addition of lime, and that to a larger extent by the use even of a liberal supply of farm-yard manure. It thus may be seen that it—in cases where the soil is deficient in one or two constituents—is only those, like ingredients in farm-yard manure, which can act as restoring fertility to that soil exhausted by cropping; and, as a consequence, that all the other ingredients in the manure are useless. We do not, of course, refer to any beneficial effects which arise, or may arise, from the mechanical action of the manure; we refer only and specially to the effects from a chemical point of view.

The foregoing facts may be called the doctrine of the minimum; that is, that by the minimum of one or of several substances the crop is produced; and that, as a consequence, it is only by those constituents in farm-yard manure which go to supply the deficiency of the same constituents in a soil exhausted by cropping, that the fertility is restored, and that all other ingredients are useless. Thus, a field rich in those constituents which go to form raw, will not be in any degree increased productiveness by manuring with subances which yield straw constituents: iese substances can only prove beneficial i soils deficient in straw-forming conituents. This, says Baron Liebig, acounts for the high favour in which farmard manure is held by practical farmers. Iolding, as it does, all the manurial contituents required by plants, it is sure to be eneficial in all cases, for whatever the plant ishes it can obtain. The operation of rtificial manures, as guano, nitrate of soda, nd the like, which are well known to increase ie productiveness of certain plants, is exlained by the principle or doctrine of miniıum which we have already pointed out. ut those not acquainted with the laws hich regulate the operation of manures, r, or are likely to err, in both the irections of using too little or too much anure. Only that the error of using too tle explains itself in practice easily enough; hile it is not so easy to decide whether or no ie is using, as one often does use, too much. his latter error arises chiefly from the notion iat the action of manures is in proporon to the quantity of them used. No oubt this is true up to a certain limit, ut beyond that limit, as we have shewn, hat is used is only wasted. It is the ffice of agricultural science to indicate how iis waste may be avoided. In support of iis view, the experiment made by Mr ussell, of Craigie House, may be here cited, i which, amongst other points, it was made vident that 3 cwt. of superphosphate gave early as much produce as 5 cwt., while 10 wt. actually gave less, very nearly in fact the ame weight as the 5 cwt. The experiment id not take, as one of its elements, the deision, which of the elements of the superhosphate exercised the chief influence upon he produce. It should be noted that magnesia nd lime are as indispensable to the turnip crop as the sulphuric and phosphoric acids. Thus Liebig points out that he has had more abundant crops by using gypsum and common salt, or phosphate of magnesia, than by using superphosphate of lime, although that, in the majority of circumstances, is the most powerful manure. In order to understand these facts thoroughly, it is essential to remember that the law or doctrine of minimum which we have pointed out, applies to all of the constituents of manure, not to one only. Thus, "where, in any given case, the crops of any plant are limited by a minimum of phosphoric acid in the field, these crops will increase by augmenting the quantity of phosphoric acid up to the point at which the additional phosphoric acid bears a proper proportion to the next minimum constituent in the field. If the additional phosphoric acid exceeds the corresponding quantity, for instance, of potash or ammonia in the soil, the excess will prove of no effect. Before the supply of phosphoric acid, the available quantity of potash or ammonia was a little larger than the amount of phosphoric acid in the soil, and the excess of the alkalies was ineffective until the phosphoric acid was supplied; similarly, the excess of phosphoric acid must remain just as inoperative as previously the excess of potash. Whilst the produce before was proportioned to the minimum of phosphoric acid, it is now in proportion to the minimum of potash or ammonia, or both alkalies." We have said that it was no part of the experiment of Mr Russell, as described, to ascertain the relation of this doctrine of minimum, or what constituents played the active part in increasing the produce. But a very slight extension of the experiment would have decided the point, for had "potash or ammonia been the minimum constituents, after manuring with superphosphate, a suitable supply of potash or ammonia, or of both, would have increased the produce."

WHEAT AND WHEAT SOWING.

THE period at which wheat is sown is regulated by, or dependent upon, the climate and locality; hence, no rule can be laid down on this point for uniform practice. As a regular thing, wheat sowing is rarely carried on before the month of October, that and November being the two months usually chosen. In some districts it may be a little earlier, but in nearly all it is carried on till through part of December, and in some till almost the very end of the year, where bad weather and other causes prevent the soil being got ready before this. The latest period here named refers only to southern districts of the kingdom; wheat sown so late in colder localities having little chance of being a crop. The period of sowing is also much regulated by the system of sowing thick or thin—if very thin seeding is adopted, early sowing will be necessary, and this brings us to the important point—the quantity of seed to be employed, per acre, about which so much has been written and said of late years, and the distance between the drills where broadcasting is not adopted. As regards the quantity of seed, in ordinary circumstances, the earlier the period the less seed required, this holding true also of genial climates, and where the soil is in good heart. This latter point has a marked influence upon the quality, the "richer the soil, the less seed required," being an axiom. Early sowing in good land may be taken as requiring from 5 to 6 pecks per acre, this going up to 8 pecks if the period of sowing is later, and in poorer soils up to as many as 9 and 10 pecks. The width between the drills influences, of course, the quantity of seed, and the question, What is the best width, is not by any means decided, nor is likely to be; indeed, when we take into consideration the varying circumstances of soil, locality, and climate, always disturbing influences. An able authority, who has very carefully experimented on this point, states, that when the distance between the drills lay between the 7- and the 9-inch intervals, the quantity of seed varied from 2 to 3 bushels per acre. The same authority comes to the conclusion, that for "tenacious soils in stiff clay," the best interval is 12 inches, and the quantity, 6 pecks per acre. Another experimenter found that where the soil was of a mixed quality, he obtained the highest results from drilling his furrows 10 feet in width, with nineteen rows, the lowest result being the plots having thirteen rows to the 10 feet furrows. Mr Mechi, the great advocate for thin seeding, says that it is "the parent or first cause of large and vigorous ears to select from." Thin seeding on heavy land, he says, is early seeding; and as to quantity, he further says, that anything beyond 1 bushel per acre is seed wasted. On 1 bushel, plants keep throughout their healthy colour; 2 and 3 bushels, plants being of a sickly yellow in spring. Apart from other points, there is unquestionably one thing in favour of thin seeding, and that is, that the land must be well cultivated, the hand and horse hoe being unsparingly used to keep down the weeds, and to stir the soil. Good farming is, therefore, compelled by the system, and, as above said—and it bears to be repeated—this is immensely in favour of thin seeding. The advocates of thick or moderately thick seeding have, however, much to say in its favour; and it certainly is, as they say, a strong point in connexion with it, that thick sowing has been carried on for so long a course of years, and by the great majority of practical men, rather than believe that they have been and remain wilfully blind to the advantages of thin sowing. It seems "more reasonable to suppose that long practical experience has taught the farmer the more prudent course of a liberal supply of seed." The authority whose words these are, undertook and carried out an extensive series of experiments upon level land of uniform quality, the soil being a good deep loam, on a chalk

e preceding crop being clover, and
y sheep. The systems of sowing
three—broadcasting, drilling, and
-and the result was altogether in
the broadcasting; the quantity sown
ushels. The drilled portions were,
ly, 9 and 12 inches apart, and the
of seed, respectively, 2½ bushels
el; and the result of the narrow drills
r quantity was decidedly more
than the wider drills and smaller
In the dibbled portion, with in-
12 inches and 9 inches, and with
of 1 bushel and 1 bushel and 3
result was in favour of the narrow
with larger quantity of seed—the
apparently guiding all three modes
, and all in favour of thick as against
g. On this same point of thick and
g we reprint the following:—

> the question of thick and thin seeding is
> we should be disposed to consider it an
> r we feel assured, that no one mode of prac-
> rsally applicable to all localities, irrespec-
> nd climate. In one locality, with peculi-
> soil and climate understood, we might
> vocate the adoption of the thin mode of
> ile, in another, we would as strongly ad-
> ery reverse mode of proceeding, and yet
> ve a reason why we did so, which would
> clear us from the charge of inconsistency.
> iction of this great truth, that agriculture
> d science, but open to all the disturbing
> f elements—themselves disturbed—as soil,
> ality, difference in manurial and regenera-
> would, we feel assured, keep down the
> or, shall we say, the dogmatism of those
> ood reason, and this may well enough be
> elieve that their theory or mode is well
> on facts derived from their own experi-
> heless err in supposing that that experience is applicable to all districts, no matter how widely the difference may be between their peculiarities of soil and climate, and those of their own. We repeat a truism when we say, that the real progress of agriculture has been much retarded by the persistency with which some have advocated the application of a system to all localities and soils, which has proved of value in their own. Agriculture is especially the art in which repeated trial and experiment are desiderated, and this trial and experiment must be conducted each one for himself. And as Lord Portman remarks, "a series of experiments for many years in the same district is required to settle the question in such district. In one large district it is found best to sow 2 bushels of seed in drills, at 9 inches apart, and that is there the general system. In another, more or less seed is required, dependent upon climate, soil, elevation, exposure to wind, game in more or less abundance, birds, insects, &c. No one rule is good for every district." On the same point Mr Miles says, "I feel convinced that very many circumstances, to be determined alone by the tenants of the respective farms, must decide the quantity of seed to be sown on the respective localities." Again, Mr Soft remarks:—"I do not believe that any specified quantity of seed can be laid down as the proper quantity for all description of soil and climate; practice and experience must alone be the guide; for, although I am willing to admit that wheat tillers will, on this soil (Lincolnshire marshes, a loamy clay on a strong tenacious clay subsoil), I find, from repeated trials, that it is not safe to sow much less than 8 pecks to the acre, on an average. I now generally begin seed time with 7 pecks as the minimum, gradually increasing as the season advances to 9 pecks per acre." Mr Roberts states that the quantity of seed varies from 4 to 10 pecks per acre, but that it depends entirely upon circumstances, such as the time of sowing, and the manner of sowing. The poorer the land, the greater must be the quantity of seed. On a poor, gravelly soil, where manure is not attainable, 10 pecks, drilled at from 6 to 8 inches, will be the least quantity required. Wherever, in such soils, this quantity is at all sensibly decreased, in like proportion both quality and quantity of the grain are decreased also.

MAJOR STAPYLTON'S ESTATE IN YORKSHIRE.

THE name of Major Stapylton, of Wass, Yorkshire, has frequently been seen in the columns of *The Farmer* in connexion with general estate improvements. When this gentleman took possession of his ancestral estates some ten years ago, he found that his estate of Wass was in a very dilapidated condition, and at once began a system of improvements on it, on a very extensive scale. New buildings were erected where required; several fields of small extent were converted into one of a respectable size; draining was extensively gone into; and waste land reclaimed where practicable, all over the estate. Not only, however, did he want to get his estate into good order, but also insisted on a better system of farming being adopted; and, in order the more effectually to further this view, some two years ago he offered a very fine and handsome silver cup for the "best managed farm" on his estate. The result was, as might have been expected—hedges which hitherto has never felt the edge of the knife, began to assume a respectable appearance; walls with large gaps in them, and otherwise in a broken-down condition, mysteriously shewed an uninterrupted line of stones; buildings to which formerly one could not approach without first encountering 6 inches of dirt, are now a pleasure to see; fields, before forming almost nothing but a large hot-bed of all kinds of weeds, detrimental to good farming, began to appear something like what fields should be; in short, every farmer striving, as far as possible, to watch his neighbour in getting his farm into good cond [illegible] deed, in his simple way [illegible] induced to keep their possessions in a bette state of things than any amount of persuasion could have made them do it; and, no that they see the advantage of it, it is no likely that they will again fall back int their old ways. Mr Parrington, from Yor who is well acquainted with agricultural matter and improvements on estates, and, besides being a neutral party, was appointed judge and some time ago he made his award i favour of Mr William Cooper, tenant of th Grange Farm. In his Report, Mr Parringto introduced a tabulated statement containing a list of all the farms on the estate, shewing opposite each possession the various points of excellence as regards the "application of purchased manure," "quality of farm work," "condition of buildings," "hedges," "walks," "stubble," "fallow," "corn crops," "turnips," "grass land," "quality of cattle," "sheep," "horses," "pigs," &c. He afterwards considered each farm separately, shewing what is good and bad on each place, and makes suggestions for the tenant's consideration. The following is an example:—

"*Pilfit.*—Most of the gates on this farm are out of order. The fallows are well done, but the wheat stubble is very foul."

This may be conducive of much good, as, each tenant has been supplied with a copy of the report, and he will thus see what is still needed in the way of improvement in his farm.

It would be well if other landed proprietors would follow the example which Major Stapylton has shewn them, in offering a prize [illegible] the best managed farm on their estates.

OVER-HUMMELING OF BARLEY.

consequence of the prevailing desire mong farmers to produce heavy barley, e facility with which their wishes in this t can be promoted, through the aid of ved grain-dressing machinery, the s of barley hummeling is now too gene- carried out to an extent which very deteriorates the grain for malting pur- and depreciates its market value a deal more than growers seem to be aware altsters and brewers complain, that since troduction of portable threshing ma- , a much greater proportion of "back or unsprouted grains, is to be seen in couch" and malt floor than formerly, ey very frequently give less for home than erior foreign barley, because they know e latter will malt better, from its ger- ing powers not having been injured by ummeling. It is not fair, however, to modern improvements in threshing and ng machines for this, seeing that the is caused by the excessive, and not by oderate or proper application of them. rsing on this subject with the owners rtable threshing machines, they invari- tate that they can regulate the hummel- ocess to any degree they choose, but heir employers generally insist upon ex- e hummeling, often not so much from tion that it will bring a higher price, as he desire that their barley should weigh vy, or, if possible, heavier than that of eighbours.

arguing with growers against the impro- of over-hummeling, they often make the der, that it is altogether a myth, and y an objection urged by purchasers with ew of cheapening their produce. For, ey, although the awns be so closely off that part of the skin, or even the he grain is removed along with it, yet the ing process will not be affected. And, less, this is perfectly true, for if even the d half of the grain be cut off, the other, which contains the embryo of the future plant, will sprout with unimpaired strength, provided that the embryo or life-bud is left uninjured; but, being prominently situated at the base or root end of the grain, this vital part often becomes destroyed through the lacerating and abrading action of the hummeler, hence arises the damage complained of; and as this damage may be done without even a practical eye being able to detect it, the easily-observed appearance of over-hummeling is held to be indicative of its existence. Laceration, or tearing up of the embryo-enveloping skin, is, no doubt, easily observed, and that more especially when the aid of a pocket microscope is employed in examining the sample. But this is not the case when the seed germ, so to speak, is rubbed and beaten to death without disfiguring its outer coating.

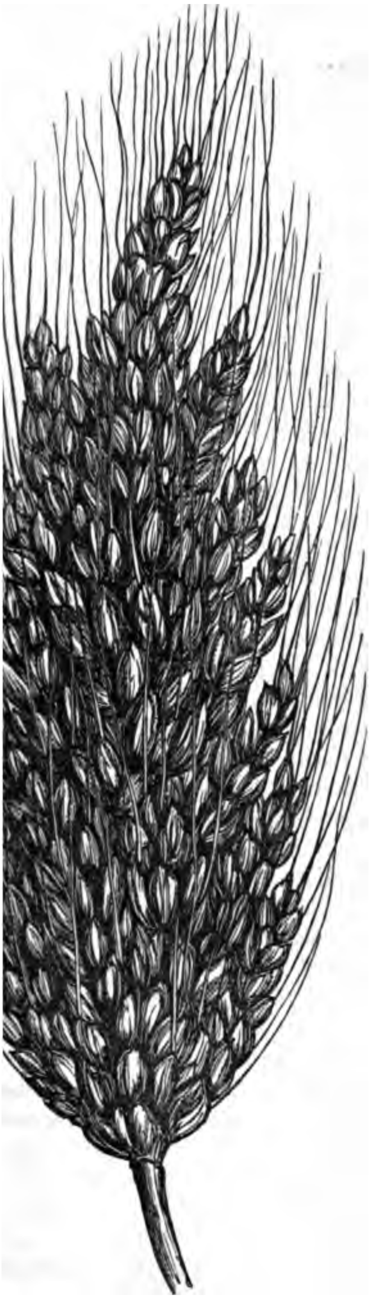
The effects of over-hummeling are as follows:—Whether non-vitality is produced by laceration, beating, or abrading, the changing of the starch of the grain into sugar and dextrin, which takes place in the process of malting, is not accomplished. When lacerated, a greenish mould sets in upon all the ripened parts, accompanied with discoloration of the embryo, during the period that the grain lies in the "couch," both of which extend more or less during the succeeding operations on the malt floor. When the embryo is killed without lacerating its covering, although less mouldiness be present, the discoloration of the embryo end of the grain is often scarcely less than in the last case. The presence of both this mouldiness and discoloration being analogous to partial decay, detracts from the colour, taste, and keeping property of the brewer's products, in proportion to the per-centage present of "back liers" or unsprouted grain. And to afford an idea of the pecuniary loss entailed by over-hummeling, it is only necessary to state, that, while under the old and ordinary home dressing appliances 5 per-cent. of "back liers" is looked upon as an average amount, 15 per-cent., equivalent to a depreciation in value of about 2s. per quarter, is a frequent result in portable-mill dressed barley; and even instances are known in which 30 per-cent. of "back liers" has been attributed to it.

The almost uninterrupted continuance of dry warm weather during the earing, ripening, and harvesting of this year's barley crop, has rendered its awns more than usually strong and adhesive, consequently more than ordinary difficulty is experienced in getting market cargoes sufficiently hummeled to satisfy the growers. The result is, that, with the new crop, purchasers of malting barley are more dissatisfied than we ever remember to have seen them. Nor need this be wondered at, seeing that 10 to 15 per cent. of "back liers" is a common occurrence on the malting floor, and even 20 to 30 per cent. is by no means unfrequent. That undue application of hummeling machinery which is thus hurtful to malting barley, is of course equally so to seed barley. Loosers in this latter case have generally, however, only themselves to blame; but its application to market cargoes entails a wanton waste and national loss, which, if persisted in, will affect the pockets of its perpetrators, and promote a preference for the products of foreign countries, where "the most improved" grain-dressing machinery is still happily unknown. Growers, therefore, take care, for consumers are now pretty well aware of over-hummeling, and assuredly they will not allow themselves to be made loosers through your imprudence.

EGYPTIAN WHEAT.

THE attention of farmers has again been called to this very worthless variety of wheat (which has been elevated by Linnæus into a species), and very magniloquent in its praises are the sellers of it. In the interests of agriculture we therefore give the following particulars regarding it, from which it will be seen that it is no novelty, but a kind that has been long known and repeatedly proved to be unsuitable for profitable cultivation in Britain.

The Egyptian, branched, or composite eared wheat—Triticum compositum of Linnæus—appears to have been cultivated in Egypt from the earliest times, and is supposed to have been the seven ears of corn mentioned in Joseph's dream, "which came up upon one stalk rank and good." Pliny mentioned it among other cereal grains that were cultivated by the Romans under the very appropriate name of Triticum ramosum. Lobel, a native of Flanders, but who spent most of his life in England, named it Triticum multiplici spica, in his "Observations on Plants," 1576; and Tabernamont, author of a "History of Plants," in German, 1588, called it Triticum Tiphinum multiplici spica—Tiphinum being the specific name given by him to the turgid wheats — Triticum turgidum of Linnæus. Both Gerarde, in his "Herball," 1597, and Parkinson in his "Theater of Plants," 1640, figured and described it under the name given by Lobel, and from their remarks it seems to have been then well known in England, but deemed "a coarse grain, yielding much more bran, and making also a heavier and blacker bread" than the wheats that were then more commonly cultivated. All succeeding botanical authors mention it under one or other of the forementioned names; but in Adam's "Practical Essays on Agriculture," 1789, it is named "Smyrna wheat, commonly called many-eared wheat, because several lesser, or collateral ears grow round the bottom of the main ear, which is very large in its state of perfection." Many other agricultural authors



Ear of Egyptian Wheat—Natural size.

blished prior to the end of the ntury, have taken notice of the n wheat under one or other of the ing names. And while some who have had little experience of it mention it in highly laudatory terms, all who have fairly tested its merits characterise it as being too late in ripening for our climate, too coarse in quality for our market, and only worthy of limited cultivation as a curiosity. Since the commencement of the present century it has been repeatedly tried in almost every wheat producing district of the country, and although, like some of the turgid wheats, it obtained a little notoriety about forty years since as an anti-fly wheat, when the destructive larvæ of the yellow wheat midge caused considerable alarm, its culture was abandoned as soon as the ravages of that insect plague became materially diminished, through the little understood operations of natural laws.

When grown too thick, or upon poor soil, the Egyptian wheat frequently produces only single or simple ears, and then it is not distinguishable from the Triticum turgidum, a coarse grained, strong growing, late ripening, but productive species, of which many varieties are cultivated in all those countries which border on the Mediterranean and Black Seas. Hence Tabernamont was right in calling it only a variety of the latter, and Linnæus was wrong in constituting it a distinct species.

Of the Egyptian or composite eared wheat, we are only acquainted with two varieties, viz., the red-chaffed and the white-chaffed. The former is, by far, the most common, and seems to have been the only one known till comparatively recent times. Both, but more especially the latter, have a place among those so-called Mummy wheats, which modern inhabitants of Egypt make the credulous believe have retained their vegetating powers throughout those thousands of years in which their grains are said to have lain wrapped up in mummies.

This, and two or three other varieties of wheat, as well as several of the non-cereal true grasses, which all belong to the natural order Gramineæ, have solid instead of hollow stems or culms. Dr Parnell, in his "Grasses of Scotland," published in 1842, in common with preceding authors, mentioned hollow stems as being one of the never failing characteristics by which grasses proper were distinguished from the sedges and rushes—Cyperaceæ and Junceæ. This we then refuted, and in his "Grasses of Britain," 1845, he admitted that there were exception to the universal application of this characteristic. Nevertheless, the error is still kep up by some leading botanical authors although a goodly list might easily be concocted of true grasses that have solid stems.

LOSS IN THE TURNIP CROP.

WE hear numerous complaints of the loss of the turnip crop, accompanied with inquiries as to the best modes for checking or modifying the ravages of those insect plagues, which in many districts have rapidly converted what, at one time, were highly promising turnip fields, into wastes of worse than useless fœtid vegetable corruption. From the description given of both causes and effects, it appears that different insect agents are operating to produce this loss of our staple feeding crop, which is already so extensive as seriously to depreciate the lean or fattening stock markets, and must have the further effect of seriously enhancing the price of butcher-meat throughout the coming winter and spring. Leaf-destroying caterpillars, root-devouring grubs, and aphidæ or green flies, have all their representatives among the most voracious turnip-destroying insects; while that minute vegetable parasite, the white rust or mildew, is often not less disastrous to the crop than any of the preceding, or even than all of them combined.

Plants in a healthy vigorous growing state are least liable to suffer from either insect or vegetable agents; but when, as in a very dry season, they are dwarfed or stunted through excess of drought, they become highly susceptible of injury from both; and dry warm weather being most congenial to the development of such pests, those results have been produced from which many have suffered great pecuniary loss, notwithstanding that they have recently somewhat improved their prospects, wherever the mischief had not previously gone too far. O leaf destroying caterpillars, those termed "niggers" (Athalia spinarum), which in occasional seasons skeletonise the young turnip leaves over wide districts, and the small green ones of the diamond-back moth (Cerostoma xylostella), which are often almost equally destructive in the more advanced stages of the plant, have recently done much damage in some parts. The grubs of the great yellow under-wing moth (Triphœna pronuba), and of the dart-moths, Noctua or Ægrostis exclamationis and N. segetum, are disfiguring the turnip roots by eating deeply into them, and flocks of both rooks and lapwings may frequently be seen searching for and devouring myriads of these grubs in the turnip fields; but, after all, it is questionable whether these borers are more numerous than usual, although from the stoppage of growth in the roots their ravages are this season more apparent. The turnip and cabbage Aphidæ green-flies or plant lice (Aphis rapæ and A. brassicæ), have both been unprecedently abundant this season, and it is to the first in combination with the white rust or mildew (Uredo candido), that the wide-spread devastations in turnip fields are almos exclusively attributable, in accomplishing which the A. rapæ has been by far the mos formidable agent. Mildew has often been more prominent in our turnip fields, but never before has its white powdery appearance on the leaves been so generally accompanied by such myriads of the turnip aphis, which seldom or almost never appear before midsummer;

at first on the under-sides of the
om whence they spread when influ-
s in the present season, by favourable
till every portion of both under and
rfaces are crowdedly covered by them.
a plant thus infected, or rather en-
the older or outer leaves first succumb
edily decay, followed in succession by
till the plant is diminished to about
original size. The remaining leaves
ome weak and recumbent under their
ating of devouring aphidæ, which, at
ge, have accomplished their work of
ion, for, although a little greenness in
ge still remains, it is only illusionary;
sh marking at the insertion of the re-
leaves, and a darkening line under
n over the crown of the bulb, shew
ipient decay is separating between the
d the blade, so that nothing need be
for but rottenness and stench, for
the only remedy is deep and imme-
loughing. Many a field of Swedish,
t a few of common turnips, that, by
althy growth, delighted their owners in
of July, are now in the state here indi-
having passed the stage for amend-
efore the occurrence of the late reviv-
l growth-promoting rain.

re provides many insect checks for
the aphidæ under; but such is their
owers of reproduction that these all
less aided by heavy showers, or other
r inimical to their multiplication. Of
nsect checks, the most conspicuous are
t kinds of those pretty little beetles the
rds, which, both in their larvæ and per-
tes, devour the green flies; the larvæ of
his-lions or golden-eye flies; several
f aphis ichneumon flies; earwigs, ants,
oth the seven-spotted and the two-
lady-bird (Coccinella septempunctata,
bipunctata) are unusually numerous this
On a thickly infested turnip leaf, be-
e thick, bloated-like greenish bodied,
s, and winged green-flies, may be seen
his-lion fly, with its two pair of nearly
sized wings, and slender body; as
oblong, short-legged, voracious, aphis-
grub. While, smartly flitting about among the others, appear the little, slender ichneumon flies, with two unequally sized pairs of wings (Aphidius rapæ), which deposit their eggs in the full sized green flies, after which these change into fixed, dull brownish, hard, horny-skinned objects.

In the generality of garden crops, the attacks of aphidæ may easily be checked or modified, by fumigating with tobacco and other vegetable preparations; sprinkling with sulphur, snuff, and other killing powders; or washing with infusions of soap, tobacco, wormwood, dwarf elder, &c.; but it is obvious that none of these modes are capable of being effectively and economically applied over extensive ranges of field crops. The turnip green-fly generally attacks the Swedes first, appearing on the under-sides or backs of the leaves, and causing contraction as well as discolouration in the attacked parts. This is the time to apply the first check, by picking off the attacked leaves, and bruising them with their devouring broods under foot, or carrying them off in close bags, pitchers, or other vessels, from which they cannot escape, and then burning them. By repeating this, they will often be eradicated or kept within harmless bounds. When, however, they have spread so as to be beyond picking off, applications of lime and lime water will be found the most beneficial. Several, we are aware, have recently tried dusting over their crops with powdered lime, without any marked results; but in these cases it was spread over dry-surfaced leaves, whereas, to be effectual, the lime should be hot or newly slacked, and spread over the leaves when they are wet with rain, heavy dew, or watered artificially; and it is essential that the weather should be dry and sunny for at least five or six hours after the application. This artificial watering of a turnip field is by no means such a difficult operation as it may seem, provided such an apparatus is employed as that which is in ordinary use for watering streets and roads. The lime should be spread immediately after, and may be done by hand from a sheet, as in grain sowing. Lime-water is another pretty effectual application, and may be made either alone in the manner beforementioned, or, better still, to have it so applied, and then the newly slacked lime spread as above. Should warm dry weather be long continued, these appliances may have to be repeated; and in order to stimulate somewhat the growth of the plants, such liquid or dissolved manures as will not hurt the foliage, might be incorporated with the water. By lime-water, we do not mean water mixed with lime as a whitewash, but that which is pure and transparent, prepared by mixing newly slacked lime with about thirty times its weight of cold water, stirring the whole well, and then allowing it to settle till it can be drained off clear before it is transferred to the watering cart, or other distributor.

THE FOOT-AND-MOUTH DISEASE.

CONSIDERABLE, indeed we may say great, anxiety is being manifested amongst the farming community, in consequence of the appearance amongst us of this disease, and which, from the accounts reaching us from various quarters, seems to be daily on the increase. Nor need we wonder at the existence of this anxiety, when we consider the troublesome nature of the complaint, the ease with which it is communicated from one herd to another, and the loss it causes, both through death and the deterioration in value of the stock should death not supervene. In this, as in other points connected with diseases, there is very considerable difference of opinion as to whether the disease is contagious or not. It will, however, be the prudent course for a farmer to take, to assume that it is contagious, and to adopt corresponding precautions. It is really surprising how careless even those are who believe that the disease is contagious; what, then, must be the conduct of those in this respect who do not so believe? By far the largest amount of experience would seem to go in proof of the fact that the disease is contagious, and can be conveyed from one herd to another by the simplest of means. It is scarcely necessary to name the symptoms of this disease, so unfortunately wide and well-known are they. The animal appears dull and listless, has fits of shivering, yet with hot skin, and clammy mouth; and in the case of dairy cows the milk is lessened in quantity. The mouth gets hot and tender, and gradually gets lined with watery blisters; the saliva is rapidly discharged, and the food is often dropped unmasticated, as if the process was too painful to be carried out. The breathing gets high, the urine coloured, and there is a tendency to constipation. The vesicles or blisters attack also the teats in the case of cows, the udder becoming swollen and tender; the secretion of the milk is lessened, and in some cases the supply is altogether stopped, while the teats are so painful when handled, that milking in the usual way must be stopped, and the milk withdrawn by means of teat tubes. We may here remark, that the milk is not of good quality, even when no tinged with blood, or rendered impurer stil by the mixture of vesicular matter, it shoul not, therefore, be sold in the usual way. Th disease usually commences with lameness i the animal, the feet getting hot and tende and vesicles appear. The inflammation i often so high, that the whole foot is affecte and the pain is very great, and the diseas is sometimes so bad that the hoofs ma drop off.

The treatment of the disease varies wi the opinions held concerning it; some of t cures, or so-called cures, belonging, in eve sense of the term, to the class of barbaro remedies; others being dependent upon more or less accurate knowledge of t pathology of the disease. Whatever the nature of the remedies employe the nature of the disease is such th

atment taxes to the utmost, the
e and *kindness* of the stockholder
iryman. Where the disease attacks
imals in a mild form, aperient medi-
ay be given, but care should be taken
ir administration, as the bowels are
ingly sensitive. The sore parts of
uth may be bathed with an astringent
as alum and borax, sugar of lead, or
n vinegar. The udder should be
ted with hot water, both before and
milking, and the teats—indeed the
surface of the udder—rubbed with some
g ingredients, such as glycerine, or
orated pomatum or lard. The milk
be frequently withdrawn, as long re-
of the milk in the udder is very pre-
l. The stall or place in which the
l is kept should be most scrupulously
so that the feet may not get wet and
When the inflammation is high, the
hould be bathed in hot water, and if
igh, poulticed, and a lotion, such as
r sulphate of zinc, should be applied at
ls.

h may be taken as a rapid *resume* of
est and most approved modes of
ent commonly observed. We pro-
to glance as briefly at a mode
cannot, unfortunately, be said to be
on, even in the most restricted sense of
rm, and which, nevertheless, we believe
of the highest possible practical value.
fer to the sulphur cure as proposed and
uced into practice by Dr Dewar of
aldy. Such is the power of prejudice,
uch the hesitancy and the doubt with
any new thing is received, that the
mention of the name of this cure will be
ent with some to urge them to put it at
out of court as utterly useless, and
ps as absurd. But it is always the
ce of the prudent thinking man, as
as of the true man of science, to
things without prejudice; in fact, to
ne all things, and try all things, and
as a result, to hold fast by that which
d. This examination of the claims of
ure in question is what we would first
rate as the duty of our readers. The
trial, we believe, will come next, and we have the hardihood to believe that this will be followed by the conviction that something good has been obtained, to which it will be well to hold fast.

It would be easy here to give facts enough as to the virtues which the antients and those of the middle ages believed sulphur to be possessed of, virtues which raised it in their estimation, to the rank of one of the "royal medicines," as those which possessed sovereign powers of healing. And although this estimation is not now maintained to the same extent, still the virtues of sulphur are by no means lost sight of or contemned in modern practice. As a disinfectant, the gas evolved by the combustion of sulphur (sulphurous acid gas) has long been recognised, and one, too, of a highly valuable character; but its use was greatly restricted, and indeed its real value almost altogether lost, from the mode in which the gas was applied—namely, to the building or places alone in which the living beings were kept; this arising from the fact that the fumes were supposed to be, if not of a positively poisonous, still of a highly deleterious character. Dr Dewar was, we believe, the first to point out the fallacy of this opinion, and to shew the immense practical value of an extension of the principle of fumigation by sulphurous acid gas. This extension consists in subjecting the living beings—human or animal, as the case may be—to the action of the gas, as well as the buildings in which they live or in which they are kept. This we beg leave to point out as a feature of the most essential importance, and one which, if overlooked or contemned, will cause inevitable disappointment. When a new thing is tried, *it is only fair* to try it in the way, and strictly after the way, indicated by the inventor or introducer. Little need be said as to the mode of applying the "sulphur" in the case of the foot-and-mouth disease, either as a preventive or a cure, or, indeed, in the case of any of the other diseases to which our stock are liable, so simple is the process. A small chauffer or open tripod stove, in which red-hot cinders can be placed, a small crucible to be heated by the cinders, and a piece of brimstone the size of a man's thumb to place in the crucible, are all that is required to fumigate a six-cow byre, this fumigation being done in about the space of twenty minutes. While the fumigation is going on the ventilation should not be too free; the object being, on the contrary, to confine the gas as much as possible, so that the coats of the animals and the whole of the building should be thoroughly impregnated with it. In conjunction with fumigation at regular intervals, it is scarcely necessary to say, that thorough cleanliness of the building in the interior, of the bodies of the stock, and the complete absence of filth of all kinds near the exterior of the house, in short, the thorough observance of all sanitary regulations is absolutely essential. Another point to be attended to is the regularity with which the process is to be carried out: it should be steadily and persistently gone on with, not done in a spasmodic fashion, now and then. In times like the present, with the prospect of the spread of the foot-and-mouth disease, the process should be carried out once every day; in ordinary times, less frequent fumigation will suffice.

So much for the process itself. What about the facts upon which the recommendation of the process is based? These are i hand, and will at another opportunity b placed before the reader—space being no too limited to afford that opportunity at pre sent. Suffice it to say, that the facts ar sufficiently striking to arrest the notice of th most sceptical, and are in every way worth of being seriously considered by all intereste in the prevention of disease amongst ou farm stock. It is just because we believ the system to be that which will be eminentl useful in this direction, that we venture no to draw the attention of our readers to i We have no other aim in so doing than tha of their benefit—as we so conceive it. Apa from this, and from the desire we have t see "truth" established, it would matter littl to us if the sulphur cure added only anothe instance to the many which history ha afforded us, of new things being placed i the category of useless things; but believin other things of it—and this belief is base upon what we have practically seen of it—w are heartily desirous to see its claims t notice thoroughly investigated, and its detail carried out faithfully in practice. If so car ried out, we are of those who believe tha the practice will not be regretted by thos who adopt it.

THE IRISH LAND QUESTION.

[From the *Times*.]

THE CONDITION OF THE AGRICULTURAL LABOURER —PAST AND PRESENT.

THE condition of the agricultural labourer about Tipperary, as elsewhere in Ireland, has improved marvellously of late years. The tillers of the soil here, in the days of Arthur Young, were usually cottiers, living on a patch of potato ground, rented at from £3 to £5 an acre, worked out in wages at 6d. a-day. Seventy years afterwards, at the period of the Devon Commission, the rent of the cottier had risen from £6 to £10, his wages having only increased to 8d., while the price of all commodities had advanced, so that he had relatively declined in the social scale; and as a large mass of agricultural labourers had grown up, detached from the soil, and without even the advantages of a cottier, this whole class was on the verge of abject wretchedness. "The distress and privations these people endure," said witness before the Devon Commission, respecting t labourers near Tipperary, "are incredible, exce to those who witness them; there is a periodi starvation in this town for want of employment." this, fortunately, has been completely changed; a partly owing to the progress of wealth, partly to t beneficial effects of the Poor-law, but principally the results of the immense emigration which occurred since 1846-8, the agricultural populati around Tipperary are in a state of comparative af ence. I have already intimated that in dress looks they appear for the most part decent and co fortable; and, considered fairly, they are as well as the same class in many English counties. T agricultural labourer of this neighbourhood is no lon a cottier serf, or in a position even more miserab

average from 7s. to 9s. a-week, paid in
arly all the year round, or a full equivalent
and food, the rent of his dwelling being
10s., and he has in a great measure given
tato, and substituted for it a better diet.
is condition in some places excites the
f the farmers. I asked the tenantry of
y—the scene of Mr Scully's exploits last
hey had any grievances now to complain of,
nswer I received was that "all would be
but that the farm boys insisted on getting
their lodging, and £1 a-month."

ENIAN RECRUITS FROM TIPPERARY.

t of material comfort, therefore, the agricul-
urers of this neighbourhood may be said to
tisfactory state. Yet this class seems to be
rom a vague sentiment of discontent; they
a good supply of recruits to the Fenian
which, in 1867, was marshalled hard by, by
l" Burke; it is from their ranks, for the most
t the perpetrators of crimes are selected.

ONS BETWEEN LANDLORDS AND TENANTS.

g, now, to the relations between the owners
ccupiers of the soil, I have to present a pic-
ore varied outline, more complicated in its
l shadows, more difficult to comprehend and
Materially, I have reason to believe the
of the mass of the tenant-farmers corresponds
of the country around, which, though not
l or improved to anything like a high point,
the whole, a look of prosperity. In this,
er parts of Ireland, the land twenty-five
o was engrossed to a great extent by
of cottiers, whose intense competition
nts in many cases to be extravagantly high,
considerably diminished the proper area of
and remunerative husbandry. This class
for the most part, disappeared, and though
ge was necessarily accompanied by an im-
ount of suffering and hardship, and occasion-
btless, of cruel wrong, the benefit which has
from it cannot be questioned. The land
ipperary is now held in farms varying from
and even 5 acres in size, 20 and 30 acres
y common; and, from every inquiry I have
occupiers, as a rule, are reasonably thriving.
as I have said, but little tillage, the great
ng dairy produce; and, at the average prices
st ten years, this mode of farming has been
profitable. In fact, though the homesteads
offices in this neighbourhood are seldom well
l though the farmers are disinclined to exhibit
ard signs of wealth, it is impossible not to
they are usually comfortable; and I have
rmed, on the very best authority, that many
ave good balances in the banks, and, what I
glad to hear, that the small holders were
well as the large. As for the rate of rent, I
do not think it high, considering the admirable qual
of the land, and its proximity to several excell
markets; and though I have heard some complai
of rack-rents, these instances, I am convinced, are
ceptional, and rents are generally paid without di
culty. From a comparison, moreover, of differ
periods, I am satisfied that the burden of rent on
tenant has been steadily diminishing; and
rents have been gradually rising, I do not think, a
general rule, they are as high as might have been
pected. I do not hesitate, then, to assert that the
cupiers of the soil around Tipperary are, in a mate
point of view, by no means an unprosperous cla
Yet the resources of the country are not half de
loped; its wealth is due to its natural fertili
and not much to the industry of man; and
agriculture is backward, and, in most cases, w
may be called its agricultural plant and fi
capital are of an inferior description. Nor are
farmers, as a body, contented; they are, many
them, dissatisfied in a vague way; they put forw
several distinct grievances; they are not, as the c
responding class in England is, Conservative in feeli
This state of things may in part be ascribed to cert
existing facts in society around. The landowners
with hardly an exception, Protestants, and the tena
are nearly all Roman Catholics; and those who kn
what antagonism of class religious differences ca
in Ireland will at once see how injurious to progr
this single circumstance inevitably is. Again, t
largest landowners are absentees, who seldom or ne
visit the neighbourhood; and though their estates
generally well managed—that of Lord Derby es
cially so, to judge merely from its appearance—
agent can never supply the place of the resident p
prietor, and the kindly link that ought to unite
tenant and his superior being broken, the whole fra
of society suffers in consequence. By these mean
barrier is raised between the classes connected w
the soil, and the natural relations between landl
and tenant are occasionally marred by hardship
wrong. With some not inconsiderable exceptio
and those chiefly of modern date, all that has b
done here for the improvement of the land, the dra
ing, enclosing, and building of farmsteads, has b
the work of the occupiers, not of the owners;
though the occupiers, during their tenancies, have,
course, received the accruing benefit, they compl
that, as a general rule, they have obtained no allo
ance or compensation. They say, moreover, that
some instances their rents have been actually
hanced in consequence of what they have t
done, and that they are discouraged from improv
by a general apprehension of such a result; and thou
I have not been able to find out well-authentica
cases of such injustice, I have little doubt that so
might be discovered. Furthermore, leaseholds are
ceedingly few; the tenancies are nearly all at will,
terminable at a six months' notice to quit; and thou
I can affirm with confidence that no general system

on exists, and that evictions from land are rare, lent that, under these conditions of tenure, the are at the mercy of their landlords; and it is rtain that some members of this class, not y kindly associations and feelings with that in e subjection to it, occasionally abuse their domi- sition. Another circumstance connected with em of tenure requires particular attention. ay, perhaps the majority of estates, an out- nant is accustomed to sell the goodwill of his ; very large prices are paid in this way for s usually only at will, and though legally a er acquires no new right, it is impossible to him that by his outlay he has not become r a part proprietor. In most instances this ight is treated by the landlords with respect, ome it has been disregarded; it has no sanc- atever from law, and I have heard of cases in n incoming tenant has been capriciously evicted he had paid his rent, and though he had, per- vested £10 an acre as a premium for merely g such possession. Such cases are extremely t when they occur it is difficult to deny that nt suffers very great hardship.

E CAUSES OF DISCONTENT AMONG THE PEASANTRY.

writer believes that the above facts fairly for a great deal of the dissatisfaction among ners. He proceeds to say:—"Still, after every fair allowance, I do not think the arrangements of landed property or their ccount completely for the peculiar notions and ies that, to a great extent, prevail among the in this district. It would be untrue to assert that anything like a war against landlords about ry; rents are well paid, the peasantry are courteous in manner to their superiors; and proprietors who manage their estates with ce to the usuages of the country are as erhaps, as they would be in England. But ot too much to say that the occupiers soil resent the exercise of some rights perty that would not cause much offence gland; they do not oppose the eviction nant who had made default in the pay- f his rent, and in some cases would not object ent of land being considerably raised; but I at this moment few landlords here would venture to serve a notice to quit, or to put an end to a tenancy at will, even though the tenant had no moral claim to hold beyond the term of his contract. I think, moreover, that the tenantry, as a class, are impressed with an idea that a great change is at hand that will decidedly improve their condition; and possibly at the bottom of the hearts of many lurks a sentiment that, subject to a reasonable rent, the land they occupy is virtually their own, no matter what the nominal tenure. There would be some equity in such a claim in cases where great improvements have been made, and large sums have been paid for goodwill; but such distinctions are not generally drawn; and though, of course, not a few of the farmers are quite alive to its real import, 'fixity of tenure' is a popular cry. In a word, feelings exist in the country of considerable force which in some points conflict with the rules of our laws about land, and I have little doubt that at this conjuncture few landowners could afford to outrage these feelings without risk to themselves. These sentiments appear in their worst form in the agrarian combinations so common in Ireland. These confederacies have occasionally taken the shape of a war of poverty against property; they have sometimes been the desperate resource of an impoverished and oppressed peasantry; but their general object has been to maintain the occupier of the soil in Ireland in his holding according to a certain ill-defined usage. It is unnecessary to say how they have administered an unwritten law of terrible import; to what deeds of blood they have given birth; and how, wherever they have made their appearance, they have been supported by popular sympathy. At this moment a combination of this kind, not organized, perhaps, but still existing, I cannot doubt, pervades this neighbourhood; though its active promoters are probably few, it is sustained by much general opinion; and though, as usually has been the case, the crimes it has sanctioned have not been committed without provocation more or less grave, they have been, nevertheless, extremely alarming. Nor, though its activity has not been great, though it has not left the mark of its presence in outrages on an extensive district, though its positive achievements may not have been many, is the scope of its influence, I fear, limited; its spirit is probably widely diffused, and it has had an effect, more or less to be traced, in controlling the management of landed property."

HARVESTING BY ARTIFICIAL HEAT.

or the farmer's own interest that he
re himself against the contingency of a
r harvest. To prevent the drenching of
nd barley and oat shocks by the downpour
nent season is beyond his power; and, in-
contrivances for keeping out the wet un-
operate, also, in keeping it all the longer
ischief, however, is not, so to speak, in the
t in the slow and precarious drying. It is
for sun and wind, the setting up of shocks
een beaten down by the storm, the turning
again and again with their dampest sides
nd thus losing days and nights together
clouds blow up for renewed downpour as
corn is once more ready for carting, and
epetition of this alternate saturating and
g that bring us grown grain and spoilt
losses of hundreds of pounds in a single
a farmer of average occupation. Give us a
ich we may expeditiously and cheaply desic-
etted crops, and so cart them directly the
—snatching our harvest, as it were, and
r produce with certainty and in good con-
g the intervals between the showers, and
e comparatively careless about a weeping
the absence of a fervid sun over the heads
ers and waggoners. Is such a dream likely
ed? What proofs have we that such arti-
ent of ripe, but shelterless, corn is feasible?
it be adopted at once by any intelligent
n?

endeavour to answer these questions. It
embered that the Society of Arts last year
gold medal, with a purse of fifty guineas,
essay on this very subject. The adjudi-
e Mr Chands Wren Hoskyns, M.P., Mr
ell Read, M.P., and Mr John Chalmers
thorities whose knowledge and judgment
he highest respect from all thoughtful and
griculturists, and the winner of the prize,
ty competitors, was Mr William Alfred
Gillwell Park, Sewardstone, Woodford,
ntleman of mechanical and agricultural as
rary tastes, and enjoying the leisure, the
nd other resources needful for developing
s the idea of his inventive genius. The
rting the results of lengthened experiments
quate scale, may be said to have established
ng conclusions:—1. Sheaves of ripened
pletely soaked with water by long exposure
ins, can be made dry enough for the stack
through them currents of heated air for
of 15 to 20 minutes. 2. The temperature of the ingoing air may be as high as 320 deg. Fahrenheit, without in the least damaging either grain or straw, for only a few ears in each sheaf come in immediate contact with the injected current of hot air, which is at once cooled by the evaporation of the moisture on the straw and ears, and the chaff scales protect the grain itself from any scorching heat, and from any burnt or smoky taint or smell, so that flour from wheat thus dried is found to make good bread, while upon five separate plots sown with wheat out of the hot-blast drying-chamber all the grains germinated and produced luxuriant plants. 3. This effectually-desiccating, but non-injurious, hot air may be supplied of the requisite regular temperature and in sufficient volume by means of a blowing-fan driven by a portable steam-engine, and drawing the whole of the gaseous products of combustion out of the smoke-box of the engine boiler, the fuel used being malting coal or coke. Or the fan may be driven by horse-power with a "horse works," the hot air being furnished by a portable stove. 4. So little motive power is demanded for the operation that an 8-horse portable steam-engine, working at only 10 lb. pressure, or one-sixth of its usual power, drives a large fan with a speed of 600 revolutions per minute, and delivers enough hot air to thoroughly dry thirty-two sheaves of very wet wheat in fifteen minutes. 5. The probable consumption of fuel is about 1 cwt. of coke for every 8 cwt. of water evaporated.

Mr Gibbs exhibited his apparatus in the Royal Agricultural Society's Show-yard at Manchester; but we believe that no official investigation was there made into the amount of fuel burnt in driving off a given weight of water from wetted corn. It was proved, however, that one of Messrs Woods, Cocksedge, and Warner's 3-horse power steam-engines, working at its normal pressure of 45 lb., could drive a four-leaved fan of 4 feet diameter and 2½ feet breadth, with a speed of 600 revolutions per minute; that the hot air supplied by the fire in the upright boiler of the engine, and also by another fire in a small stove, was delivered by the fan at a temperature of 320 deg.; and that this torrid blast was able to expel from 32 sheaves of very wet rye no less than 1¼ lb. to 2½ lb. of water per sheaf in the course of fifteen minutes.

We have now to consider how this valuable invention can be made immediately and extensively available for drying the corn crops at present yellowing for harvest or already falling before the scythe, the sickle, and the reaping-machine. The motive po
or
may be at a few day's notice, in every
sion. If he has not a portable stea

own, and cannot hire one from a letter-out of steam threshing-machines, he has or can quickly procure, a common "horse-works" for three or four horses. A blowing-fan of proper dimensions will be supplied upon application by Mr Gibbs's manufacturers, Messrs Woods, Cocksedge, & Warner, of Stowmarket, or Mr Gibbs would probably furnish to any implement or machine maker, or to a village smith, descriptive details for the very simple construction of a fan, with its galvanized sheet-iron casing and its indraught and delivery passages. The arrangement of this fan for being driven with a speed of 600 to 800 revolutions per minute, either by a belt directly from the fly-wheel of an engine, or by a belt from a rigger, upon what is called the intermediate motion of a horse-works, can present no practical difficulties to anybody accustomed to farm-yard machinery. The hot blast is to be obtained in this way:—If you work a portable steam-engine, remove or close up the chimney; take off the door of the smoke-box, and fit to the aperture the sheet-iron indraught or feed passage, which will take all the gaseous products of combustion to the central openings in the sides of the fan casing. A screen of malting wire must be interposed over the smoke-box opening, so as to intercept live sparks, which might be dangerous. If you are limited to a common horse-works for driving the fan, or if you propose to dry on such a scale that the hot air from the engine might prove insufficient, you can very easily construct a stove that will furnish the necessary volume of heated air for the hot blast. Make a furnace of sheet-iron, somewhat like a long horizontal box with upright sides, and arched top, and a bottom of iron pipes arranged longitudinally, these pipes forming the firebars upon which the fuel is burnt. There are to be an outer and an inner casing, like two boxes of similar shape, but a few inches different in size, one placed within the other, the few inches of space between the two sheet-iron cases being filled with earthenware tubes, as drain-pipes, longitudinally arranged up the sides and over the top. Perhaps suitable dimensions might be 6 feet or 8 feet length, 2 feet breadth, and about the same height; and more than one of such stoves could be used in connexion with one fan. When the fan is set in motion streams of air pass above, below, around, and through the fuel, through the pipes, and along the interstices between them, absorbing and utilizing almost all the heat evolved during the combustion. Any intelligent smith could fashion such a stove from a sketch and instructions, and thus, up to this point, we have both the motive power and the hot blast quickly procurable, and no more difficulty or delay need be found in fixing up the part of the apparatus which holds the corn while drying.

In Mr Gibbs' invention each wheatsheaf, in an upright position, with the ears uppermost, is spiked upon a conical tube of 18 inches length, and a jet of hot air, rising through the tube, is injected into the centre of the sheaf in such a direction as to rush upward through the mass of ears. At the same time, number of small perforations in the lower part of th conical tube admit hot air also into every part of th straw end and middle of the sheaf. The sheaf-tubes made of sheet-iron, are fixed upright upon a sheet-iro floor, and stand in ranks, 18 inches apart, and at intervals of the same distance in the rows, the floo forming the cover of a receptacle into which the blas of heated air is driven by the fan. The arrangemen reminds one of the pipes, sound-board, and wind-ches of an organ. The tubulated flooring is supplied b Mr Gibbs at a price of about 1s. 6d. per square foot and all the farmer has to do is to contrive a suitabl form of structure and a plan of working tha shall enable him to dry a large quantit of corn with the least extent of this flooring with the least amount of shed or of the coverin necessary to keep in the heat, with the greatest despatch, and with the least expenditure of labour What would be the best, most economical, and mos business-like arrangement it is not for us to prescribe but, by way of illustration, we will suppose a case. Upon any convenient plot of ground, in or near th rick-yard, a space is cleared and levelled, and a structure of planks erected, say of the following form:—Planks on edge set up between light uprights make wall 36 feet in length (being in two lengths of 18-fee deals) and 8 feet in height. Two end walls, each o 14 feet in length and 8 feet high, and three partitions of the same length and height, enclose fou stalls or boxes of equal area, each box having ground floor of 14 feet by 9 feet. The top is covered by similar planks, and the four open ends of th boxes are closed at pleasure by means of rick-clot curtains hanging from the front edge of the flat roof It will be observed that the planks are not cut o injured in any way beyond the slight damage tha may arise from the heat and damp, with the exception that two of the lowermost planks are cut in sho lengths to leave apertures for the entrance of the h air, and that some other of the wood is subjected to little nailing. In each of the four boxes is fitted tubulated iron floor measuring 14 feet by 9 feet, a therefore having upon it fifty-four of the vertical shea tubes, which stand at 18-inch distances; and this flo is supported underneath, so that it is about 8 in or 10 inch off the ground. A single plank, in t 18-feet lengths, closes the front of the hot-air chamb between the iron floors and the ground; earth or c is banked or plastered up against the plank wa all round for a few inches in height, and t four tolerably air-tight hot-air receptacles connected by sheet-iron passages, of perha 1½ square feet calibre, with the blowi fan, which is placed close behind the sh about midway of its length. Dampers are provid so that the current of hot air can be directed into one or more of the chambers at pleasure; and interstices between the planks of walls and roof all st air to escape from the boxes that are with corn. Suppose that a cartload arrives field at every twenty minutes, bringing on an 108 wet and heavy sheaves, and that twenty are allowed for each drying. The work pro- us :—A cart deposits half of its load in front partment No. 1, one man throwing off the , and another man, with lad assisting, sticking pon the sheaf-tubes. This may occupy ten , when the cloth is let down in front of npartment filled with its fifty-four sheaves, hot blast is turned on. The second half cartload is placed in compartment No. 2. ct cartload similarly fills compartments Nos. 3

When the third cartload arrives from the mpartment No. 1 will be again ready for its n, because forty minutes have elapsed since the filling began; and, of this time, ten minutes cupied in filling, twenty minutes in drying, and iutes in clearing out the dried sheaves. One d two lads accomplish the clearing and loading corn upon a separate service of, say, two carts onvey it to the stack. Fifteen minutes being y a sufficient period for acting upon the sheaves iot air, the emptying of each compartment and ling of the dry-corn carts may proceed with de- n, giving the stuff more time to cool and to part with its steam before finally reaching the rick. The hands required, in addition to the usual carrying force requisite for transferring the crop from the field to the stack, are three men and three lads, viz., one man and boy charging the compartments, one man and two boys clearing and loading, and one man putting up the dried corn upon the stack. It will be perceived that the plan of charging four compartments with two loads, instead of having only two compartments of the size of four, is adopted for the purpose of obtaining ample time for the manipulation as well as for the drying of the sheaves, yet with a *minimum* area of shed-room and tubulated flooring. Equipped with such an apparatus, the farmer would be in this position :—After a rain, instead of his horses all standing idle, and his men merely setting up fallen shocks, one set of carts would at once be kept busy in leading from the field, and drying, and making the corn safe in the rick-yard. The saving of his crops would be a certainty, although, of course, a more expensive business than in uninterrupted fine weather; and this avoidance of great risk, and, perhaps, of a serious destruction of produce, would cost him, it may be, 1s. per quarter upon his whole crop of cereals. But if only one-half of his white corn had to be treated by hot blast, this we suppose to be an excessive estimate.—*Correspondent of the Times.*

WORD TO FARMERS ABOUT SELLING THEIR PRODUCE.

E following sensible remarks by the *American Agriculturist* are worthy the attention of English :—Farmers are often blamed for not selling roduce as soon as it is ready for market. And be confessed that those who do so, taking one ith another, do quite as well, all things con- , as those who hold on in hopes of getting prices. They obtain their money soon after , and are enabled to use it to advantage. s in grain can obtain 'money much more easily armers, and can consequently hold the grain

le, therefore, we think farmers often do better ing early, there is still room for the exercise of nt. One reason why it is usually best to sell , that most farmers are disposed to hold on to rain as long as possible, and when the time that they must sell, there are more sellers than , and the price declines.

a curious fact that people generally are more d to sell when prices are low than when they h. When wool was 80 cents a lb., it was more lt to induce farmers to sell than when it was 40 per lb. Last fall, with red wheat at 2.25 dol. in the interior of Michigan, farmers hesitated longer in making up their minds to let their crops go than they did last summer, when they were offered 1.25 dol. for the same wheat. It is a good rule to sell when you can get a price that will afford a good living profit. Farmers, at the present time, would have been richer by millions of dollars than they now are had they adopted this rule last autumn. We know of a great many who sold wheat this summer for 1 dol. a bushel less than they refused for it last fall. The whole nation suffered greatly by this indisposition to sell when a good price could be obtained. We might have shipped all our surplus wheat to England at a fair price, but by holding on we lost the opportunity, and finally sold at a price below the cost of production. We should take the lesson to heart.

On the other hand, when prices are low, we should not be in a hurry to sell. Sound wheat is an article that will keep, and it is an article that is always required, and it is absolutely certain that it cannot long remain at a price much below the actual cost of production. We cannot hold out hopes to such farmers as grow only ten or twelve bushels of wheat per acre, that they will obtain prices sufficient to compensate them for their labour. The country must be in a very unsatisfactory condition when such is the case; but we do firmly believe that there is no reason to doubt that a farmer who raises good crops is safe in calculating that sooner or later he will be able to obtain such a price for his wheat as will enable him to make a fair profit.

There is one fact in this connexion that should not be overlooked. In a cool, wet, late season in England, the wheat crop is always below the average. And they have had such a season the present year. On the other hand, it is very doubtful if the wheat crop of the United States is as large as was anticipated. We feel tolerably certain, therefore, that before another harvest, wheat will bring a price sufficiently high to afford the wheat grower a good living profit. He should be satisfied with this.

The question arises: What price should we obtai for wheat, to afford us a fair profit? At the presen price of implements, machines, and other necessar articles, not forgetting labour and taxes, we shall no obtain extravagant profits if we sell good sound red o amber winter wheat—say in Michigan—for 1 dol. 50 cents per bushel.

A farmer who raises anything less than 20 bushels per acre will not get very rich, even if he obtains, in our present currency, 1 dol. 75 cents for red wheat, and 2 dols. for choice white wheat. When we can get these figures in ordinary seasons, it is not safe to hold on too long; but when, immediately after harvest, the price is much below these figures, those who can afford to hold their wheat run very little risk of loss in doing so.

FISH GUANO.

As the ocean catches a large waste from the land, we should use diligence to restrain this way, and also to seek a return from the sea of at least a portion of the waste from the soil. Considerable returns are made to the land, which are insensible to this, and other returns we take therefrom which meet our senses.

It may not be generally known that there are large quantities of fish which inhabit the sea, and abound along our coasts, at certain seasons, which, although unsuitable for food, yet may yield products valuable in the arts, and also to agriculture. These fish are utilized to a considerable extent along our coasts, and as their products become better known, they are extended farther inland, and the sea yields to an increasing demand for these fish and their products.

Fish, as a fertiliser for some crops, have long been used. The aborigines—we have it—used fish to apply to their limited crops of corn, on their old fields, and as the white colonists along the shore brought the land under cultivation, and it began to shew exhaustion, they saw their value, applied them, as taken from the water, and derived great benefit therefrom. They were applied to hill crops in the hill, one or two to a hill. Some were spread broadcast and ploughed under; others lay till partly decomposed before being ploughed in after spreading. The results produced were such that the practice of applying them spread rapidly among those living near the shore where the fish could be readily obtained. These fish are small, averaging about a pound each. For many years this application of the fish, in their crude, raw state, was the only known or practised mode, but as time progressed, inhabitants increased, and new products were demanded. The inventive genius of our people found that they were capable of yielding a product which could be used to good advantage for a variety of purposes, and that this could be abstracted and leave the residue scarcely inferior as a fertilizer, and in a more convenient form for transportation. As this became obvious, advantage was taken of the same, and to-day we have a considerable business established along our coasts for the purpose of extracting the oil from the fish, which, after going through certain processes, becomes valuable as a substitute for some other oils; the residue, consisting of bones, flesh, &c., retains all that is of material value for manure.

Where the fisheries exist, immense seines or nets are used, and hauls are made extending over miles of fishing ground, and immense numbers are gathered, so that they cannot be hauled ashore, but boats are loaded and taken ashore from the "haul." The fish are taken to the factory and put into large tanks, capable of holding 20,000 or more fish, and covered with water in the tank, and then steam-cooked about three-fourths of an hour, when the water is drawn off, and the fish put in cylindrical curbs, and the oil pressed out by means of a hydraulic press. The yield of oil averages five or six gallons to the thousand fish. This, as pressed out, has water with it; it runs togethe into a tank, where it remains exposed to the sun, &c., to bleach, some twenty-four hours, when the oil i taken off, barreled and sent to market.

The fish refuse is thrown out of the curb, to break it up, &c., and afterwards pressed a second time, when it is removed under sheds and placed in a pile, where it lies for a convenient time, when it is barreled or bagged for market; each package is weighed a put up, and marked, and by this weight it is sold

crude "fish guano," and as such contains a
rable per cent. of water, which evaporates con-
ly by standing in a dry situation.
te, manufacturers have made a more concen-
.rticle from the scrap, which is done by drying
hen passing it through a mill, grinding it quite
The crude is held at a less price, and for gene-
poses, when the transportation is set aside,
e valuable in proportion to price than the
; but the latter, where to be transported a
:, may be the cheaper. The price of the
.t the factory, at the present time, is about
;. (£5, 4s. 2d.) per ton of 2000 lb. The
dvances as the demand increases, and it is
farther inland. A few years since it almost went
ıg for a market, at less than 20 dollars per
ivered at any port in New England.

This guano makes an excellent fertilizer for corn, rye, and some other crops, and grass, if composted with muck or other like material. Its nature is such that it is dangerous to a crop, used without first greatly diluting. It should be composted, adding for each barrel from 2 to 3 tons of good muck or farm-yard manure, and about half a bushel of fresh ground gypsum ; and after getting warm be overhauled, and again shoveled over after lying a few days. This will make a fine fertilizer and well equalized. I prefer to use it while fresh and warm for hill crops, or when applied broadcast. It can be composted, and in four to six weeks it will be ready for use, smoking warm. Some think it better to compost in the fall, and let it lie over winter ; but my experience is, it does more good applied warm.—*W. H. White, in American Agriculturist.*

SHEEP FARMING ON STRONG LAND.

BY MR WILLIAM BELL, HARLOW HILL.

; subject is one of considerable importance,
ıd must frequently have engaged the attention
ıcerned in the cultivation of strong land, and
ecially in this county, where land of this cha-
so extensive. Taking into consideration the
bility of a permanent rise in the price of grain,
asing demand for labour ; and, on the other
e enhanced price of butcher meat and conse-
mand for pasturage, it becomes all the more
ve that the subject should be considered in all
ıgs, and some decision arrived at as to the
de of applying it to feeding purposes. On
s the cereal crops are chiefly depended upon,
ıe preparation for them, if the expenditure
e curtailed, or an increase take place in the
:he produce, or crops of a more valuable de-
can be substituted, it appears to be very im-
that after the improvement effected by drain-
and will be much further increased in value.
se of manures and good management it will be
:o a higher state of cultivation, thereby yield-
ger produce ; but too frequently, as soon as
withdrawn, it recedes to its former state. On
:etentive portions, turnips, rape, and cabbages
;rown ; but it is important to inquire whether
be grown to advantage. For such crops it
ial to have the land prepared and the seed
proper season ; and as the disadvantage of
ing operations too early is well known, the
;t be performed in a much more limited time
quired in land of a freer nature ; consequently,
se power is required, greater expense and
ıtailed, and the objections to consuming the
crops on the ground are so great as scarcely to warrant the production of them to any extent. However, I believe it will be generally admitted that of the above-mentioned roots the cultivation of the turnip will be found most profitable ; and as there exists a diversity of opinion as to whether strong arable soils capable of growing green crops can be more remuneratively employed in the feeding of stock than if laid to grass, I will endeavour to shew the number of sheep likely to be profitably fed on the turnips grown on such land, worked on the four-course system—assuming the roots are drawn off the land as early as possible—stored up and consumed upon a dry and well-sheltered pasture, care being taken that the land from which they are led is sufficiently dry so as to prevent it from being poached or cut in the operation, otherwise it not unfrequently follows that a deficiency is experienced in the yield of the succeeding corn and hay crops.

I may here mention that sheep fed under cover will consume a less quantity of food, and perhaps feed quicker ; but by such a mode I do not think there is much to be gained ; they require considerably more attention, and if laid on to grass in the spring, I have noticed that they do not make the same progress or feed so quickly as those fed in the usual way. The extent of strong land a man and a pair of horses will be able to cultivate on the four-course system, one-fourth being in turnips, is 44 acres. We have first 11 acres turnips, averaging say 14 tons per acre ; and as a sheep cannot be depended upon leaving more than 3s. 4d. per month, and will consume in that time about 7 cwt. of turnips, the 11 acres of turnips will carry seventy-three sheep six months, leaving £73; 11 acres of barley, 5 qrs. per acre, at 28s. per qr., £77; 11 acres of hay, 1 ton per acre, at £4 per ton, £44; 11 acres of oats, 5 qrs. per acre, at 20s. per qr., £55; 11 acres of oat straw, £11—making a total of £260 for the 44 acres. The straw and hay supposed to be eaten on the premises, and the manure made to be applied to the land for the corn crops. From the above we must deduct expenses as follows:—Keep of horses, wages for men, small work, blacksmith and joiner's work, &c., £110; seed for the above-named crops, £17; manure for turnips, £27, 10s. From the average value of crops we may put down rent, including rates, at 28s. per acre, *i.e.*, £61, 12s.; total, £216, 2s. The capital required will be six times the rent, or say £369, and the amount of profit, after deducting the expenses, being £43, 8s., is at the rate of £11¾ per cent. for interest on capital, management, and casualties.

You will perceive by those figures that the average yield of crops has not been taken, but is still liable to be affected by unfavourable seasons. Assuming such land to be worked with a bare fallow, 60 acres will be as easily cultivated with the same capital and at the same cost as 44 acres with a root crop; and calculating on the same principle, making allowance for extra small work and manure, which the root crop requires, it will be found to leave £13½ per cent., shewing that the advantage of a turnip crop on strong soils is more than met by the additional cost it is attainable at.

From the above calculations it would appear to be unprofitable to grow root crops purposely for the feeding of the sheep on soils where they cannot be advisedly consumed, though, when horses are not kept solely for the purpose of working the whole of a strong fallow quarter for a root crop, to a certain extent, a portion may be grown to advantage to assist in breaking up the straw, and carrying store cattle and sheep over the winter. On fine working soils the result is entirely different, they being worked at considerable less expense, and the roots drawn off or consumed on the ground, and the land ploughed at almost any season without incurring scarcely any risk to the succeeding crops.

How, then, are we to keep pace in supplying a population increasing at the rate of about 200,000 per year with butcher meat? It has been suggested to increase the stock in this country that a prohibition of the slaughter of lambs and calves would be beneficial; but when we consider that even at present no hay, straw, turnips, or grass go unconsumed, it appears such a mode would only tend to enforce the slaughter of older animals. The impossibility of increasing the stock without first increasing the articles of food fo them must be evident to all; and the weekly variatio of about 2s. per stone in the quality of cattle sold in ou fat markets, is a proof that there is an ample suppl of store stock in the country, and a scarcity of food t bring it to perfection.

On looking at the agricultural statistics which hav been recently issued, we find 870,857 acres standin under the head of bare fallow. Now, supposing it t be cultivated on the four-field system, which is likel to be most generally adopted on inferior soils, we hav 3,483,428 acres of this class of land in England an Wales; and judging from what we see around us, comparatively speaking, doing little towards the keepin and feeding of stock. Then, what might we suppos would be the result, if a large portion of this description of land was laid down to pasture? Taking, fo instance, the 44 acres to feed seventy-three sheep si months, and assuming it to be sown away with spring corn crop. The capital required will be abou £9 per acre, or say £396, viz., 30s. per acre for seeds 50s. per acre for manure for a top-dressing in th spring following the cutting of the corn, leaving £ per acre for the purchase of stock, management, &c Now, it may with safety be estimated that 1 acre wil carry two sheep throughout the year, and a shee calculated to leave 2s. 6d. per month. We find on deducting rent, that the 44 acres will carr eighty-eight sheep, and leave a profit of £17¾ pe cent., less the usual losses a sheep stock is subject t —against 44 acres arable feeding 73 six months, an leaving £11¾ per cent. And assuming out o 3,483,428 acres of this kind of land there are 2,500,00 on which, from the nature of the soil, a root cro cannot be advantageously grown; and supposing it after having been laid out dry by draining, to be sow to grass in such a way as to enable it to carry tw sheep to the acre, by this means the sheep stock this country would be increased by 5,000,000, an mutton and wool produced to the value of £7,500,00 per year. And as a sheep leaving 30s. should produc 2¾ stones of mutton, the addition to the country i butcher meat would be 85,937½ tons, and equal to yearly importation of 343,750 foreign cattle averagin 40 stones each.

From this statement it must not be inferred that is most beneficial to graze new lands solely with shee or that they will convert grass into a greater weight meat than cattle, but merely to give an idea of ho our home supply of animal food might be augmente The supply being regulated by the demand, stock either description would be reared accordingly. N do I think any serious loss need be apprehended t the country in corn and straw.

RYE AS FOOD FOR HORSES.

wing, which we have translated from gn journal, will be interesting on the ding of horses. It explains a method substituting rye for oats, and has d by many farmers on the Conti- rmer who first introduced it tried a experiments, and at last decided perior value of the method now ex-

EEDING HORSES AT A SAVING OF 30 TO 50 PER CENT.

nine first the old system of nourishment, standard the prices during the month of

	fr.	c.
t Example, Strongest Ration.		
s at 25 centimes . .	2	50
y at 18 ,, . .	1	26
aw at 10 ,, . .	0	70
	4	46
2nd Example.		
s at 25 centimes . .	2	0
y at 18 ,, . .	1	08
aw at 10 ,, . .	0	60
	3	68
3rd Example.		
s at 25 centimes . .	1	50
y at 18 ,, . .	0	90
aw at 10 ,, . .	0	70
	3	10
4th Example.		
s at 25 centimes . .	1	0
at 18 ,, . .	0	72
w at 10 ,, ...	0	80
	2	52
tion.—1st . . .	4	46
2d . . .	3	68
3d . . .	3	10
4th . . .	2	52
	13	76
f the four rations above .	3	44

According to the new plan, calculated at the same price, the expense will be—

	fr.	c.
1st. 5 kil. rye, boiled with 15 litres of water, will give 22 litres, weighing 24 kil. rye, valued at 18 centimes	0	90
1 kil. rye in farina . . .	0	20
2 ,, hay at 18 centimes . .	0	36
1 ,, cut and mixed with 3 kils. cut straw . . .	0	48
7 ,, straw at 10 centimes .	0	70
	2	64
2d. 4 kils. rye at 18 centimes .	0	72
½ ,, farina . . .	0	10
2 ,, hay at 18 centimes .	0	36
½ ,, cut hay . . .	0	9
2 ,, cut straw . . .	0	20
6 ,, straw . . .	0	60
	2	07
3d. 3 kils. boiled rye at 18 centimes	0	54
½ ,, farina at 18 centimes.	0	10
1 ,, cut hay . . .	1	18
2½ ,, cut straw . . .	0	25
2 ,, carrots . . .	0	8
6 ,, straw . . .	0	50
	1	75
4th. 2 kils. rye boiled at 18 centimes	0	36
½ ,, farina . . .	0	10
1 ,, cut hay . . .	0	18
2½ ,, cut straw . . .	0	25
5 ,, carrots and beet . .	0	15
5 ,, straw . . .	0	50
	1	54
Recapitulation.—1st example .	2	64
2d do. . .	2	07
3d do. . .	1	75
4th do. . .	1	54
	8	00
The average amount of each ration is	2	0

The average expense, says the author, being 27 francs —44 frs. for the four first, and 2 frs. for the last four —shews a saving of 1 fr. 44 cents. daily per head. Farmers need not count the price of straw, which would reduce the expense to 2 frs. 74 cents. by the first plan, and to 99 cents. by the economical. The straw may be converted into manure. Supposing three thousand horses to exist in Belgium, it proves a saving of more than 100,000,000 francs. As for the ten thousand army horses, nothing would be easier than to submit them to the *regime*, and thus save 10,000 francs per day, at the rate of 1 franc per horse. But you will ask, what guarantee do you offer for this change? The best I can offer is the constant use I have made of it, with the best success, for the last sixteen years, on forty horses of all ages. These horses have been employed in all kinds of agricultural labours. I can affirm, that since they were submitted to this diet, they have shewn a much greater aptitude for labour, and are more vigorous, have enjoyed the best health, though worked very hard. It can be attributed only to the change of diet. Many persons have tried this plan and succeeded; with some it failed, not being conducted right. As a second guaranty for its superiority, I take the opinion of a commission, named by M. le Ministre, to try its efficacy. This commission, composed of professors of the veterinary school, have examined it with the greatest care, and have unanimously approved of the method I adopt, which presented to them a saving of 40 per cent. Now it is 60 per cent., which is owing to the reduction of hay, which was formerly a part of their diet. It is a mistake to attribute to boiled rye the property of exposing the horses to colic. It forms, on the contrary, one of the healthiest and nutritic element when well prepared; not an atom is lo The prejudice against cut straw is equally withc foundation; it is good both for horses, catt and pigs. To substitute rye for oats we must n change too suddenly; change gradually for fifteen twenty days, diminishing the old rations. Let us sh how to prepare food for ten work-horses. Throw kilogrammes of rye and 150 litres into a copper hol ing 300 litres of water, boil it slowly, stirring up t contents. It is enough boiled when the water clear and the grain swelled. Then throw t whole into a tub, and let it lie to from two to fo hours. As it cools, the rye absorbs the liquid, a acquires a thick consistence. Then mix 25 kils. chopped straw, 5 kils. of rye flour or barley, 1 kil. salt dissolved in a little water. The quantities give are sufficient to feed ten horses for one day. Addir to this the straw, which I give the horse, the expen will be about 1 franc 50 cents. This nourishment sufficient to repair the loss of the animal during i hard labour, and preserve them from the numerou evils to which they are subject. By the use of ry oats, becoming in a manner useless, will be succeede by other plants, principally fodder. They will thu be able to feed more cattle, obtain more manure, an thus increase the fertility of the soil.

WHY THE BOYS LEAVE THE FARM.

IT is a fact worthy of mention that a majority of farmers' sons, instead of following the occupation of their fathers, adopt some other calling. Not that it is universally so, but especially in the east it is noticeable that the farmers' sons who follow in the footsteps of their fathers are a minority. The question naturally arises, why is this? Why do we have cause to notice this with farmers more than others? While it is very true that it is necessary, in order to fill up the ranks in the other walks of life, that many must come from among farmers' sons, yet it is not necessary hat a *majority* should. And while it is also true that here may be many among the other callings who are better adapted for farmers, and should take the place of those leaving that profession (and probably in a neasure do), yet it is noticeable, especially in the arts, hat generation after generation follow in the footsteps f their ancestors. Now, why is it that the farmer, ith one of the best of occupations, and possessing vantages over almost every other calling, cannot y as much? It would seem that there must be a ult somewhere, either in the farm or the farmers; nd as we can discover no reason why the farm, with l its advantages, should not attract the farmer's son, if he rightly understands these benefits, we conclude [illegible] fault lies with the farmers—which, to my mind, is the only true conclusion at which we ca arrive. It is then some fault in the farmer's educatio of his son.

Although the farmer desires and strives to make hi son of the same mind as himself, he overlooks or ne glects one important part in his education, and thoug he has been never so watchful, the farm often become distasteful to the son. From the time the child ap proaches youth, he gradually becomes accustomed t "chores" and light work on the farm, or, as is to often the case, is driven into it, and is made to feel i a burden instead of a duty and a pleasure. As a na tural consequence, the child thus driven, often rebels, an is too often managed in a way which is no credit to th farmer. As he grows older, more work is thrust upo him; he is commanded and obeys, feeling himself littl more than a slave, and of course takes little interest i the work, and thinks the farm and farm-work a drudger in general. Thus he approaches manhood. He feel himself little better than a servant, and is often treate as one. His tastes and wishes are consulted i nothing. He knows little of the father's plans in re gard to the farm, and consequently takes no interes in them. He sees little of the world outside of hi own town. The pleasantest thought connected wit the farm is toil from morning till night. He look him and discovers that it is different with the ant and the mechanic, and those with whom he me in contact in other callings, and the farm es distasteful to him. He has never been shewn vantages of the farm—on the other hand has ut its disadvantages. He becomes dissatisfied scontented, and leaves the farm for ever.

s is but an ordinary picture of the case; though a dark one, yet it gives an idea of the way in the son becomes dissatisfied with the farm. The first fails to instil into the mind of the child e is working for kindness—in other words, to his father. There are few children who will e to work if they know this. Then he neglects t his son as a companion, a helper and a coun- instead of a servant. He fails to impart to s plans of improvement and such things as will interest him and fix his attention on the farm, and consequently he fails to awaken his interest in behalf of the farm. He forgets to teach him the immense advantages and benefits of the farm, and fails to shew him enough of the world that he may understand these things for himself.

Farmers should understand these things, and endeavour to keep their sons on the farm. I have attempted to give little argument. Much might be said, but the subject needs it not. Every farmer can see the case in its true light if he but chooses. It seems indeed a great wrong that farmers should have a scarcity of help, when the merchant and the mechanic have an overplus. Farmers, stop and think—it is well worth your while. If you but think, you can understand far better than I can explain, and profit by it.—*A Farmer's Son.*

Papers by Tim Bunker.

XIII.—BOOK FARMING AT HOOKERTOWN.

MR EDITOR,—I suppose every man likes to know how the truck he sends to market suits his customers. At any rate that is the case at my house, where a good report of the butter, and a call for more, is certain to keep my wife good-natured for a week. As the butter is tip-top, and I bring home the news once a-week, she passes for a very amiable woman the year round. Now, I suppose an editor may have some human nature about him, and may like to know how his wares suit the market, and what sort of influence they have upon the world.

There has been a great change up here in Hookertown during the last four or five years. Since then we have got our Society agoing, and I guess I speak within bounds when I say that ten times as many agricultural papers are taken as there were five years ago. These things have had a mighty influence upon farming, and I should think in our town the garden crops had been doubled, and full twenty per cent. has been added to the crops in the field. Some folks have got to taking the papers, and reading them, that I should as soon have expected to see reading Latin. Seth Twiggs was in at our house last evening, and he was telling how he come to take the *Farmer*. I give you the story as he told it to me.

"I tell you what it is, Squire Bunker, that lot o' garden stuff I see'd you putting into the cellar did the work for me. You see, I'd always thought that this book-farming was the worst kind of humbug, leading folks to spend a heap of money, and to get nothing back agin. I'd heard the Parson and Deacon Smith, and the young Spouter from Shadtown, (there was a twinkle in Seth's eye here, and a very grave look at Sally), talking about guano, and what tremendous crops it would fetch, and then again about phosphates an superphosphates, which was all as dark fate to me. You see I thought them bi words was all nonsense, and the stuff itse no better than so much moonshine on th land. The Deacon's crops, you know, hav been amazing for some years, and then th strawberries last spring and your lot of stuf convinced me that there must be somethin about book-farming after all. So I wen home and talked the matter over with m woman, what the minister said, and how th crops came in where they used the sub-sil plow."

"Well," says she, "Seth, what is the us of your always standing by, and hearin things said that you don't understand, like stupid calf? Why don't you scribe and tak them books?"

"Cause why? How can I afford it? haven't quite paid for my stock yet, and th baby was sick this winter, and the doctor' bill isn't paid. And you know, wife, we hav always gone upon the principle that 'a penn saved is two-pence earned.' We can't spen a shilling for farming books."

"Well, Seth," said she, "never mind. can raise the shilling. 'Where there is will there is a way.' I can make the ol shawl and bonnet do another year, and tha will be a couple of pounds in your pocke Everything that a farmer has to sell is high at any rate, we should think so if we had t buy it. I can remember well enough whe butter was only tenpence a pound, now it i double. Seth, if you railly want them books I'd have them any how. It wont take great deal of land to raise an extra bushel o potatoes, and if you're put to it for help, I'l agree to hoe 'em."

"Enough said," says I. "Woman, I'm bound to have the books." So I sent pound down to the agent for the *Farmer* by the Parson, the last time he went down to the city, and it wa'n't long before the number came, as full of good reading as an egg is of meat. I had a regular set-to a reading on't, the first night, and I declare if it wa'n't smack twelve o'clock before I gin it up. I'd got along to know all about superphosphates, when wife spoke out—says she: "I thought them farming papers was all nonsense!"

"Don't talk," says I. "You see this paper, wife, is on my side. It is shewing up the humbug, and no mistake. And there is more humbug in the world than I ever dreamed of."

Upon this, Seth lit his pipe and vanished in smoke.

XIV.—HIS VIEW ON PASTURING CATTLE IN THE ROAD.

MR EDITOR,—You see, I was so busy last month, planting, and getting things started for the summer, that I didn't find a minute's time to write to anybody, and hardly to be polite to my neighbours. I wish all my neighbours had been as busy, and as slack on politeness as myself. But no sooner had the grass began to start in the spring, than some of them began to send along their compliments by their cattle, as much as to say, "By your leave, Mr Bunker, I will keep your lawn in front of the house well cut and shaven, and won't ask you anything for the job." I counted, on Saturday, at least a dozen animals in the road. There was Jake Frink's horse and colt, and Bill Bottom's drove of yearlings, and Uncle Jotham Sparrowgrass's two cows, besides two or three other folk's cows, that I should not like to mention in the same company.

Now you see, Mr Editor, if a man's going to be polite at all, it is always best to attend to it in person. This sending along civilities by stray cattle is rather doubtful courtesy. It might happen, you know, that the shaving of one's lawn down to the roots would not be acceptable, and, if it were, a second civility in the shape of the hogs to turn the sod of the lawn bottom side up, might be a little too much of a good thing. (You see I hav learned to say "*lawns*" since I commence reading the papers).

Now, I don't like to say a word agains my neighbours in general, or Hookertow people in particular. But this turning cattl into the road is a piece of bad morals that i a disgrace to any community. It is agains the law, and every man has a right to p stray animals in the pound, and make th owners pay damages. But if one enforc the law, it always makes trouble, and the ma who finds his cattle impounded, always fee aggrieved, and lays up a grudge against h complaining neighbour. He does not co sider that he has himself been an offend first, and violated the law. It is a cle case, that when roads were laid out the ceased to be private property, and we henceforth to be held for the public good, t serve simply the purposes of travel. If man turns his cattle into the highways t feed, he violates the rights of his neighbou as much as if he turned them into his neig bour's pasture. He appropriates to his ow use what belongs to another. He not on trespasses upon the public domain, but h cattle become a nuisance to the whole neig bourhood. They enter every open gate a yard, and frequently become unruly, le fences, and destroy crops at this season the year. The loss of temper from the constantly recurring provocations is ve great. I think Job himself would ha fretted some, to have waked up in the mor ing and found a dozen cows in *his* cornfiel

It is a barbarous practice, and costs t community a hundred-fold more than all t grass in the road is worth. We have make a great deal more fence than we shou need if everybody confined their cattle their *own* pastures. Now, every man has fence all his lands by the road, not for own convenience, but to keep other fol cattle from trespassing upon him. I ha been in countries without fences by the roa side for miles, and rode through the stand corn, rye, and oats, without seeing a cow calf. When we reckon the cost of fenc we can see to what a large expense farm are subjected, to give a few penurious people the privilege of pasturing their cattle in the road.

You see, Mr Editor, I am not going to stand this nuisance any longer. I shall give Jake Frink and Bill Bottom one fair warning, and after that, if their cattle are found in the road, they will go to the pound. This kind of politeness costs too much entirely. What do you think of it?—Yours to command,

Timothy Bunker, Esq.

[Squire Bunker is right. Cattle feeding on the road-sides is a nuisance that should not be tolerated in any civilized community. The pound is a sure remedy. Let him try it.—Ed.]

XV.—TIM BUNKER ON THE WEAKER BRETHREN.

Mr Editor,—I see by a former number that you had your reporter up here, taking notes at our Farmers' Club. I had no idea that he was around, or I should have fixed up my remarks in a little better shape, and dove-tailed the argument on mixed papers a little tighter together. I hold that what a man sees fit to print, should be water-tight. I want you to understand, and the public also, that I am not responsible for anything the reporters say about me, and that none of Tim Bunker's sayings are the genuine article, unless they come direct from Hookertown, and are over my name. You see they have got to counterfeiting my name already, just as they have those wonderful pills that cure everything. It was only the other day, that I saw a lot of my sayings in the *Times* about bad butter, that were never designed for the public at all. It was a private talk between me and my old friend Jones, and who in the world put them things [illegible] more than I can tell [illegible] across [illegible] Jones, the [illegible] it than he would like to tel

I took my pen in hand to say a word about a class of farmers we have up here in our neighbourhood. You see, in the church they have a kind of members that the minister calls "the weaker brethren." They don't seem to have faith enough in them to make their religion of any account. They are always at the tail end of the heap, and like the stragglers in a flock of sheep, under the wall, or stuck fast in the mud. They are a disgrace to the cause.

Now we have some Hookertown farmers, that make me think of these weaker brethren 'fore all the world. They don't read the papers, and don't believe in good farming any more than such disciples believe the gospel. You cannot get them to take the agricultural journals, and they laugh at all the new tools that have been invented to help farmers in their work. Instead of cleaning up their fields so as to use a mowing machine, they sweat over the scythe at the rate of an acre a day. Instead of having a covered pit to save manure, it is mostly wasted in the yards and highways. Instead of sheltering cattle, in the cold snowy weather, they fodder them out all winter. I do not know but I am wicked, but I wish every one of them could have been out that cold night in January last, when the mercury froze. I think they would have learned to pity dumb cattle. I find such farmers are always complaining of hard times, and are never able to pay their debts. They are always running down farming, and talking about emigrating, just as if a change of place was agoing to change their characters, and make such shiftless farmers thriving men.

Now I have been thinking that these weaker brethren were living on "Missionary ground," as the saying is, and that the farmers who read the papers ought to come over and help them. It is no use for you to advertise your paper on this account, for such people do not take any paper, either political or religious. If one of your agents were to come along, and ask them to subscribe, they would feel insulted, if they could get near enough to them to make their business known. I am going to propose to our Farmers' Club to go out among these weaker brethren, and see if we can't get them to take the papers, and mend their ways. You see they can't

re mere book farmers, and that our
are all moonshine, for they know that
s look enough sight better than theirs,
our farming pays, so that we have
o lend. After all, Mr Editor, there
ng like an argument with the hard
the end on't. It does weigh. They
te the farming that brings the clean
That is the kind of farming we find
per recommends, and as it is a poor
t don't work both ways, I send you
n cash for a dozen subscribers gather-
ng these weaker brethren. Consider
the first fruits.—Yours to command,

TIMOTHY BUNKER, ESQ.

I.—TIM BUNKER ON CURING A HORSE POND.

DITOR,—Your readers have already
omething about Jake Frink, and how
the premium on carrots over me
Hookertown Show. Perhaps they
ike to hear something about a horse-
hat Jake used to own, about half-
ween my house and his. It was full
r of a mile from his house, but as it was
rest water that nature had provided,
always been used to water Jake's
nd cattle, when they were not in the
It lay by the road-side at the foot
tle hill, and the water for all the wet
he year flowed off over the adjoining
aking it a sort of quagmire, except
of drouth. An animal would mire
art of the field up to its knees. It
ccurred to him that he could bring
to his yard at a little expense, and
s daily journey of his cattle to the
He never thought how much manure
ted along the road, and what a nui-
s cattle became to his neighbours, as
re often turned into the road, to get
nd to take care of themselves. He
ought that the horse-pond spoiled
of the best land on his farm, and that
im every year a lot of money to keep
watering place. The quagmire did
him the interest on £5 a-year. It
have paid him ten per cent. on £50.

The horse-pond I did not care anything about, but Jake's cattle, geese, and pigs; always drawn up my way by this water, were a perpetual torment to me and to my neighbours. I thought I had a right to abate the nuisance, so I hailed neighbour Frink one day, last autumn, about selling the 2-acre field near the horse-pond, for he was the owner of it. It was before the show, for since my remarks about stimulating the carrot crop with *horse manure* he has been rather offish. Ever since I put down the tile drain in my garden I have formed a great idea of curing wet land, and I thought this piece of sour, unprofitable pasture might easily be turned into a productive meadow.

Says I, "Mr Frink, what will you take for that bit of swamp land at the foot of the hill?"

"It is worth about £5 an acre, I suppose. You hold a note against me for about what the land would come to. Give me the note, and I will give you the land.

"That is rather a hard bargain, neighbour, the land does not pay you the interest on half that sum. But as I want the land, I will take it."

The deed was given, and I took possession last November. We had a wonderful mild winter, and I went right to work upon the land. The old, broken-down wall by the road-side, that had always been an eye-sore to me, I immediately dropped into a 4-foot ditch, making a covered culvert of the stone. There was fall enough to take all the water clean from the bottom of the ditch, and carry it off at the lower side of the adjoining field. I cut four ditches at right angles to the ditch by the road-side, and put in tile at the bottom. The depth to which they were laid varied from 3 to 4 feet, as the surface was not exactly even. I had no sooner cut the main drain than the horse-pond all ran away, leaving the bottom at least 2 feet above the water line in the adjoining drain. The change in the look of the land is astonishing even to myself. Here, where cattle have always mired as they went out to crop the first grass of May, there is now a firm foothold. I have already ploughed the most of it, and have put in a crop of early potatoes. The drains are just thirty feet apart, and the tiles at the lower end constantly discharge water, and will probably continue to do so, until midsummer.

But my astonishment was nothing compared to Jake Frink's, when he came along and saw his horse-pond entirely evaporated.

"My goodness, Squire Bunker, what does this mean! What am I going to do for a place to water my cattle in?"

"Hold, neighbour Frink. Did you sell me this piece of land?"

"I did."

"Did I promise you that I would not improve it?"

"No, you did not, but who'd have thought that you was going to knock a hole in the bottom of my horse-pond in this style?"

"Water will run down hill, neighbour Frink, and I can't help it. The same law that enables me to drain this swamp will bring water from the hill side right into your yard and house. You then can save all your manure, just as I do, and your cattle will not have the trouble of going after water in the cold of winter, and you will not have the trouble of scouring all Hookertown to look them up. Your cattle will no longer be a nuisance, and you will save yourself a world of fretting and scolding. I have really done you a kindness in drying up this pond-hole. But as you may not look upon it in this light, I will give you the muck that lies in the bottom, at least a hundred yards of the wash of the roads, and the droppings of your cattle for the last twenty years. It is better manure, to-day, than a great deal that you cart out of your yard."

Mr Frink took my remarks in dudgeon at the time, and hardly spoke to me for a month. But this spring the lead pipe was laid, and he has now as good a watering trough, fed with living water, as any of his neighbours. The muck, too, is not despised, for as I write I see Jake's cart, well loaded, going up to the yard where muck has hitherto been a great stranger. In short, I have strong hopes of making something out of Jake yet, though he cheated me out of the premium. But whatever may be true of his reform, the horse-pond is thoroughly cured, and if you will come up here, I will shew you as handsome a piece of potatoes as ever grew out of doors.—Yours to command,

TIMOTHY BUNKER, ESQ.

XVII.—DOMESTICITIES AT TIM BUNKER'S.

Our readers have become so much interested in the affairs of Hookertown in general, and at Squire Bunker's in particular, that we feel obliged to keep them "posted up" in current events thereabouts, even if not in al cases strictly agricultural. The Squire ha been so busy with other engagements that h failed to send us the usual letter for th month, and so we sent up "our own corre spondent" to report generally on the state o the Squire's farm, and the corn crops in par ticular. We regret to say, however, that th young man we sent up there had his hea turned (or rather his heart) by the Hooke town damsels, and came back nearer addle than any fellow we have seen in a twelve month. The whole report he sent us ha such a tint of rose colour, that we hav reduced the tone full one-half, besides throw ing out lots of poetry, that were more appr priate to the *Ladies' Journal* than to ou matter-of-fact publication. Well here is

"OUR OWN REPORTER'S" REPORT—SOMEWHAT GARBLED.

Hookertown, Tuesday.

MARRIED.

SLOCUM—BUNKER.—At Hookertown, on Thu day last, by the Rev. Jacob Spooner, Rev. Josi Slocum, of Shadtown, to Sally, eldest daughter Timothy Bunker, Esq., of this place.

The above slip from the ***Hookerto*** *Gazette* of this morning will indicate pret clearly the character of the clover fields yo reporter was called upon to inspect. I mu say, Mr Editor, that I never was quite much taken aback as upon last Thursday. had supposed, from your instructions, that was simply to inspect Squire Bunker's i provements, and to report. I had prepar myself to take notes upon extensive meado upon under-draining, subsoil ploughing, & I thought my Sunday dress was hardly need in a short trip to the country, and so I ca

my every-day toggery. Young John
r met me at the station, according to
aent, and away we went, up hill and
for about six miles, after as handsome
of black mares as you ever set eyes on.
: breeding has received a new impulse
ookertown within a few years, and the
l exhibitions are hard to beat in any
of the county. Gentlemen of ample
s have taken hold of the business, and
spare no pains or money to secure the
best stock. John has a passion for
-flesh, as the readers of the Tim Bunker
s are well aware. Though a lad of
ı, he is about as mature and well posted
m matters as the old gentleman himself.
team, which belonged to himself and
was well broken to the saddle, and with
d road could do a mile inside of four
:es. We were just thirty-five minutes
ıg over from the station, and John said
should have come much quicker, but
told him not to drive fast."

ıen I reached here I found the place all
and Squire Bunker's lit up with such a
of excitement as has not taken place
the horse-pond was cured. I supposed
vere getting ready for some grand doings,
soon learned that Miss Sally was a
and that Rev. Mr Slocum, of Shadtown,
ıe fortunate individual who was this day
ıd her to the altar. The house and
n were full of the country lasses, the
l-mates and more intimate friends of the
coming up to sympathise with her in
ave-taking of home, and in her depar-
or the parsonage of Shadtown. Was'nt
ıumble servant in a fix, to be caught in
a presence with his field dress on?
a clover field as this was a good deal
than I had bargained for. I have seen
hing of beauty and womanly grace, as
as an opportunity to see on the pro-
les and in the parlours of the metro-
but I never met with a company so
ul and accomplished as were gathered
honour to this occasion.

'as easy to see on very short acquain-
the home influences under which these
:ers had come up—the thorough practical training they had received in the schoolroom, as well as in the kitchen and in the parlour. Probably the county is better furnished than any other with the means of education. In almost every important town, there is a good institution, not only accessible to the daughters of farmers, but largely patronised by them. Here they go with their brothers, as soon as they leave the village school, to be drilled in many of the same studies with them—to emulate them in the natural sciences, in mathematics, and in the languages. The emulation is a healthful one, and the boys are generally put upon their mettle to keep out of the way of the girls. The embellishments of female education have this very substantial groundwork of *mental discipline.* It is claimed here, as sound doctrine, that a girl who studies geometry will make a better pudding and sing a better song than she possibly could if she knew nothing of Euclid; that Cicero and Sallust, German and Algebra, are only appropriate *discipline* for the wash-tub and for the cradle. Such a training gives breadth of mind to woman, and a strong, practical tendency to her maternal influence. Children brought up under such home influences, with the usual religious training, cannot be otherwise than well balanced and steady.

If you have imagined a company of simpering misses gathered at Sally Bunker's wedding, you are greatly mistaken. There was such a charm about their dress, that one hardly thought of it, and, for the life of me, I cannot tell now what any of them wore, save the fresh picked flowers, which so became them that they seemed always to have grown there. The conversation was intelligent and pleasing, like that of most well-bred people. They entered fully into the spirit of the occasion, and were determined to "see Sally off" in good style. Not only were the parlours at Squire Bunker's appropriately ornamented, but the whole house had been festooned with white roses. That is the way they do things out here. The minister's wife is married to the parish as well as her husband, and is as legitimately a subject of criticism and jealousy. She must do duty, fill her place, conduct prayer meetings, and be an ensample to the flock, as much as the shepherd himself. No one can quarrel with this demand, for it is a legitimate fruit of the system of female education. Woman fills a large sphere out here. She is a man, and something more. The vocation of "the Woman's Rights orators" would be gone in Hookertown, and they would be set down as vain babblers.

Now, I shall not tell you of the wedding ceremony, which came off at eleven, A.M; of the entertainment at Squire Bunker's, got up, I suspect, as much for your benefit as for his daughter's; of the notabilities of Hookertown there assembled; of the agreeable things there said and done, touching agriculture, and culture of other kinds; of the dance got up b a few of the young folks very slyly, on a gree patch of turf in the garden—an affair that wa not laid down in the programme; and o divers other matters that would be appro priate to a work of fiction.

Suffice it to say, that the whole thing wen off in the happiest manner, and the jollifica tion of to-day, the firing of cannon and th snapping of fire-crackers, the shouting of th boys and the gala dresses of the girls, th holiday aspect of old and young, might b taken as a little outbreak of Hookertow enthusiasm at the marriage of Sally Bunker At the next country wedding, may I be ther to see! YOUR REPORTER.

Our Library Table.

ts Resources, Parks, and Prospects, as a
Field for Emigration. By WILLIAM
KMORE. London: Sampson Low & Co.

ADO is a new claimant for public favour
gards emigration, and those who are con-
a change of location, would do well to
advantages offered by this fine territory,
ed States of America. It is situated about
f the Continent, with Kansas on the east,
o the west. It is now connected by rail-
ew York, and can be reached in eighteen
his country.

ept the statements recorded in this hand-
e as correct, Colorado seems to be the
rado. Not only is gold to be found in
but likewise silver, copper, iron, lead, tin,
nd what is of greater interest to our readers,
and is highly productive, and the grazing
nsurpassed anywhere in the world. All
or the present is, that a quarter of a million
ill come and prove the wealth of its re-
l so secure their own fortune.

ly seems to possess, within itself, elements
es of the most varied character, and which
o make it one of the wealthiest States of
For full details, our readers must refer to
itself, which has evidently been compiled
care and scrupulous fidelity. A few par-
wever, will be of some interest.

ral wealth is astonishing. Large tracts
with pastures, perennial in character, so
ic stock of all kinds thrive throughout the
n the rich and nutritious grasses which it
Epidemic diseases are unknown. The
ng cattle to the age of four years is esti-
s than £1 sterling, per head, while the
ng sheep to the age of one year is less than
er head. The cattle when fatted are
rail to the large eastern cities, where they
purchasers at prices that well repay the
ner. It will thus be seen that the pastoral
the country can be turned to great and
ediate profit.

the statements as to cereal crops seem
lous, but they are supported by varied evi-
most reliable character.

ent valleys, barley yields from 30 to 66
acre; oats, 40 to 65; wheat, 30 to 70,
erage is given in several allotments of 165
otatoes per acre. Fruits and vegetables of
ow most luxuriantly.

The volume is almost too honest in one particular, which must detract greatly from the many decided advantages Colorado offers to emigrants from these shores, and that is, that the Indians appear to be the sworn enemies of the settlers, and are a constant source of confusion, danger, and loss to all who are engaged in stock raising and in all farming. If intending emigrants can confront this evil, they might do worse, and could not do better than face "Westward Ho!" to Colorado, having first studied the contents of this interesting volume.

Milk Fever in Cows. London: Day, Son, & Hewitt. 22 Dorset Street, W.

A VERY interesting and practical pamphlet on the nature and treatment of this dangerous, and frequently deadly, malady, has just been published by Messrs Day, Son, & Hewitt, London. Their remarks seem dictated by sound common sense. Of the nature of the disease, Messrs Day, Son, & Hewitt maintain that milk fever "is something more than exhaustion and debility," that it "is a contamination or infection of the blood by some morbific agent;" and the burden of probabilities, at least, are in favour of their idea. The part most interesting to owners of cows, however, is the treatment, a summary of which we quote:—

> "Milk fever usually sets in about the third or fourth day after calving; it may come on in twenty-four hours, or be delayed to the tenth day, or even later. Every cow about to calve should be maintained as nearly as possible at a healthy standard, neither unduly stimulated nor depressed by food or physic, remembering that the act of parturition is a natural process, and all animals, with few exceptions, will be equal to the emergency when it comes. For ten days before calving a dose of aperient medicine with a little ginger should be given occasionally in the morning, and the animal should be allowed free access to water, and have turnips and laxative food, by which the blood is kept cool and fluid, and facilitated in its movement through the smaller capillaries of the body. The udder ought to be emptied of milk night and morning for some days before calving.
>
> "Milk fever having set in, what plan of treatment is best adapted to meet its varied symptoms? If a cow that has been fed on very stimulating food, and has given a good supply of milk, is seized with great fulness of the vessels about the neck, blindness, and staggers, and the milk has deserted the udder, there can be no question about freely unloading the bowels with aperient medicine, given by the mouth, and copious injections of warm-water clysters; indeed, it will always be a safe proceeding to empty the bowels at all stages of the complaint, unless the degree of prostration be so extreme that, until the circulation is

little rallied by stimulants, the animal may not bear the additional shock which even slight purgation may induce. Cases vary, and some are to be met with occasionally where the abstraction of a moderate quantity of blood does good, as in threatened apoplexy and fulness about the vessels of the head and neck. The unloading of such vessels gives exit to impure and poisonous blood, and the circulation is carried on all the more actively, and the tendency to congestion and effusion is prevented. But this is of no avail at a late stage of the disease ; it will only hasten the fatal issue. If done at all, it must be done early. The cow should drink plentifully of cold water, if hot and excited, or gruel and water ; and fresh air ought to be freely admitted into the stable.

"Supposing, then, that a cow is in the state it is commonly met with—prostrate and restless, with short breathing and feeble pulse, in fact, all the signs of exhaustion being present, without any marked indications of pain—in such a case it will be necessary to give stimulants at once. Administer one pint of brandy in a quart of gruel every three or four hours according to the urgency of the symptoms. If no rallying take place in an hour after giving the brandy, it should be repeated, and then under no circumstances must it be had recourse to till four hours have elapsed. In the intervals, carbonate of ammonia is a most valuable medicine, and ought to be given in all cases. Half an ounce of this medicine may be mixed with a pint of gruel, and given every four hours. If the bowels have not acted, it will be well to throw up a copious clyster of soap and warm water, to which is added an ounce of oil of turpentine. This not only assists to clear away all obstruction from the bowels, but to rouse the system from the lethargy it is likely to sink into, and to favour the expulsion of air and flatulence, which, by accumulating in the bowels, give rise to colicky pains, impedes the free action of the diaphragm, and embarrasses the breathing.

"If the cow is cold or shivering, keep her covered, and where the depression seems dangerous to life, have a long narrow slip of flannel wrung out of hot water, and then saturated with turpentine, and applied to the whole length of the spine. Unless there is evidence of much pain, and the animal has power, and the bowels are free, laudanum is a dangerous remedy. It should only be employed in cases of great pain. When there is extreme prostration, and a disposition to head symptoms, it would assuredly accelerate a fatal termination."

The *brochure* altogether is a valuable contribution to our cattle pathology, and should be in the hands of all those interested in the subject.

The Garden.

THE SUBURBAN AND AMATEUR'S GARDEN.

DUTCH BULBS—THE HYACINTH.

me hyacinth is derived from Hya-
us, a favourite of Apollo. It was
y Gerard, so far back as 1596,
s being named in his "Herbal"—
nd double blue, the purple, and
A quarter of a century later,
enumerates eight sorts, and the
wards was steady and unabating.
ums, quite fortunes at that time,
upon securing bulbs of some of
nd finer sorts. Loudon records,
lopædia of Gardening," page 828,
the beginning of the eighteenth
ter Voerhelm, one of the famed
sers, sold his seedling named
Great Britain" at 1000 florins a
n up to the middle of last century
for possession of good sorts was
wonderful, the tidy sum of £200
m to be given for a single root.
er times, moderation, comparatively
as prevailed. No such extravagant
ither asked for or given. Securing
f any choice novelty is one thing,
individual bulbs quite another.
nd dealers in this country are
nough and fond enough of success-
ercial speculation to offer good
s for plants or bulbs that they can
and multiply, and find a market
of afterwards, but hyacinths are
nd the pale of their powers. To
growers they must all go, year by
ock to supply their customers.
ead of giving 200 or 400 florins for
lb, the best and rarest of them can
a twentieth part of the smallest
d. There are such a variety now
rst-rate decorative sorts that large
prices cannot be got. Enterprising dealers may be inclined to venture a goodly sum for a decided gain, either in colour of flower, form or length of spike, in order to swell their chances of taking priority at some of the great exhibitions of the country. No private grower, however, will spend a ten pound note for a dozen of varieties when much finer varieties, as a rule, can be had for the tenth part of that sum. While the tendency of the age is progressive in respect of gains from a floricultural point of view, it is retrogressive, and very properly so in this particular, with reference to prodigal expenditure. Economy is a very expressive word in the English language, and it can be studied with advantage in the matter of selection of flowers.

The demand is somewhat enormous, looking to the increase of well-to-do population, but the supply is co-extensive. The great Dutch growers have their customers at all the marts of the temperate zone, and the extent of their bulb acreage is regulated accordingly. The small growers compete with them, and the markets generally become clogged, so anxious are the Dutchmen to do a good stroke of business. Every city and town, and centre of population of any extent is supplied, in addition to the ordinary sources of retail, and the auctioneer is instructed to dispose of the bulbs at such prices as they will fetch. The war of trade opposition is like the war of extermination of races; or the struggle for existence going on in plant life uninterfered with, stamps out a few, and has a general depressive tendency on the market, so far as bulb prices are concerned, so that British buyers can be satisfied with lots of the more plentiful sorts at very low prices.

Dealers in this country, however, as above alluded to, cannot meet their foreign brethren on a fair field so far as the producing of the article is concerned. It is a kind of farming, like sugar or tea plantations, which demands a peculiar climate. We can grow and flower the bulbs, after they have been matured, as well, and better, probably, than any other people who try their cultivation; but to raise them from seed and go through the several years' culture necessary for proper and full-flower development, we cannot essay to compete with the Dutch grower. The climate and the soil of Holland, especially the warm and moist districts in and around Haarlem, are particularly favourable for the rapid growth and development of hyacinths, and for the complete maturation of the bulbs. The ground heat during the longest-light month of the season is very high, much higher than that of England, and has a favourable influence upon the produce, tending rapidly to consolidate the ripening bulbs.

Having touched very briefly upon the rise and progress of this favourite bulb, let us come now to treat more immediately upon the cultural requirements. Its capacity of endurance is well known, and its capability for living upon sufferance is greater than any other bulb, or probably any other plant, and hence its suitability for city and suburban gardening. For indoor decoration and indoor cultivation, it is the *facile princeps* of Flora's subjects. Scarcely any amount of cold known to or experienced by us in the country, can injuriously affect it during the growing period. At the time of inflorescence it must never be in an atmosphere under 38 degrees Fah., else the flower blossoms or pips will be injured more, however, from accumulated moisture, accompanied with cold, than with cold itself. Under certain conditions some of the varieties will bear tropical heat, and consequently the forcing process which gardeners apply s successful. The period of flowering is by this means prolonged, for, under wise culture, and with a variety and numbers in hand, flowers can be had from Christmas till about the beginning of May.

So much for its capacity of endurance in extremes of heat and cold, and the lesson which it consequently inculcates upon all reflective minds. Its capability of living upon sufferance may be so put, if sufferance it may be called. For the first three months of so-called cultivation in the annual routine o growth it may be treated to total darkness Indeed it has been proved beyond dispute that a cool dark position at the period in question is about the best that any one could select. Not that such conditions are absolutely essential, but they have a tendency to develop the full vital powers that are concentrated in the bulb. What every grower ough to avoid is conditions favourable to undue evaporation; what every grower ought to study is conditions favourable to the husbanding of moisture, without the necessity of artificially applying it at that stage, until the pot or the glass, as the case may be, is full o roots. The whole secret of successful culture of bulbs is first to provide for the generation of roots, and the leaves and flower stems in a measure will take care of themselves. Undoubtedly the first stage might be successfully passed over by the learner, and fine roots and massive crowns appear only to be abused afterwards in an improper atmosphere; but cases' of this kind form the exception to the general rule. All our city growers are more ready to err in the initiatory process than in the second stage, and for this very simple reason, the first is what might be called an unnatural process, the second a natural one. Total darkness and minimum heat are not such conditions as a tyro would elect or provide if left to confer with his own wits. An airy atmosphere, and copious light, the absolute essentials for success in the second stage, is what all might readily resolve to cater for from beginning to end of the hyacinth season; and if that were done wisely, considerable gains in the shape of good flowers and flower spikes would be the upshot.

But the converse often happens, and let us state a case which will tend more to the elucidation of the subject than a dry advice or admonition. The city grower buys a dozen of hyacinths. They may be either placed in sses or in pots, or in both. If glasses be lected, they form by no means despicable antelpiece ornaments, and then they are aced in the sitting-room. Of course, winter quires considerable artificial heat to make r homes comfortable within doors. The oms are seldom at a temperature below 50 eg., and the mantelpiece, forming almost a ortion of the fire-place, is considerably igher than the general temperature; consequently, the heat which is comfortable to the uman system is oppressive to the bulbs at he stage of root formation, and the life lood, or vitality, is imperceptibly passing off nto the atmosphere, instead of being utilised or root development. There is, in truth, a lesperate war going on—a war of spoliation, he arid atmosphere being the insidious ntruder. Roots certainly form, but languidly, assing down into the water, and assimilating uch food as they can manufacture to sustain hem; but the reciprocal connexion between he foliage and the bulb is enfeebled, and ll this culminates in long, lanky foliage, qually ill-favoured flower-spikes and flowers; f not altogether unsightly, a sorry reward for irst cost and keep. In pots so placed, notithstanding the bulbs are hidden so many nches in the soil, nearly the same effects ecome apparent; for if the evaporation has ot been so rapid, the heat has induced prenature development of foliage without a coresponding production of roots to keep up nutual continuity. This is a great infringenent of a natural law which cannot be conealed.

Turn to the other side of the question, and et the city florist place his bulbs in a cool oom, no matter whether the thermometer hould be under 32 deg.: far better so than 0 deg. above it. At the first stage, planted ve shall suppose in October, and in early ovember, they may be concealed in closets, r placed on the mantelpiece or on the window sill, just as it suits the convenience of parties; only, let it be understood that no artificial heat is to be given them. If kept dark, the water supply at first will be sufficient to keep them for weeks; and all the better if such be the case, as it shews with the condensation of the moisture in the place that the glasses are recouped and that the food supply to the growing roots for what is being constantly utilized is sufficiently balanced by a desirable state of the atmosphere. The bulbs may be kept so till the middle of January; at that time, in this cool atmosphere, the glasses will be quite filled with crowquill-like roots twined round in all directions, and the crowns will be strong and full. At the first stage, it was desirable to induce root formation, and by heeding the above instructions the end will be obtained; in the second stage, density of habit is the desideratum; for, if that can be induced, the flower spikes will be equally dense, and the flowers produced in the highest state of perfection. The roots are the active agents for developing a proper inflorescence, and when the leaves develop themselves from their impact state, and spread out clear of the flower stem, a light and airy atmosphere must be presented. Without that, not only etiolation but attenuation, a sure concomitant of the former, steps in and destroys the effect of what might be called promising plants. The agency of light, and the distribution or rather circulation of air is of first import to the proper development of leaves and flowers. Every opportunity ought, therefore, to be taken by city growers to expose their plants, when about flowering, to the full influence of light. The plants themselves, as can be seen in every window-sill, grow towards the light, impelled by its stimulating influence, and they become consolidated in tissue in proportion to the amount of light and air presented to them. Cold currents are to be avoided, and they are more likely to be so in city sitting rooms, than even in greenhouses, and frames, for the convenience of the inmates themselves.

Such hints, as above thrown out, may really be said to constitute the *rationale* of culture of hyacinths in glasses. Water may be supplied as seems to be necessary. Stimulants are safe and yet dangerous things—safe when judiciously applied, dangerous in the hands of the unreflecting and the careless. Guano is recommended very generally for this work ; it adds vigour to the growing plant, only, its too frequent application acts more upon the elongation of the foliage, than upon the well-being of the flowers. When applied, only let it be when the glasses are full of roots, and then about fortnightly. A small pinch will suffice. The frequent changing of the wat practised by some, is futile ; it is better leave it unchanged altogether, than be co stantly intermeddling with it, the practice en ing in results scarcely less favourable th the old adage—" too many cooks spoil t brcth."

FORMATION OF ROCKWORK FOR ALPINE PLANTS.

THERE is not in the whole range of horticulture, says the *Field*, a more interesting subject than this, nor one that has been more completely misunderstood or mismanaged. Bodies of stone or brick, rubbish and earth, dignified by the name of " rock-work," abound all over the country; but we do not know three places in the United Kingdom where they are made on a proper principle, or tastefully embellished, as they ought to be, with the exquisite flora of Alpine regions. We have several times expressed ourselves decidedly on this subject, and now have much pleasure in giving some hints upon it by Mr James Backhouse, of York, accompanied by sketches to illustrate his meaning. Combining wide knowledge hardy Alpine and other plants with peculi tact for cultivating them, and the high taste in creating, on a comparatively sm but true scale, miniatures of the haunts th frequent in a wild condition, his opinions as nobody who has seen and understood t rockwork in the nurseries at York need told—are the most valuable that could obtained on the subject.

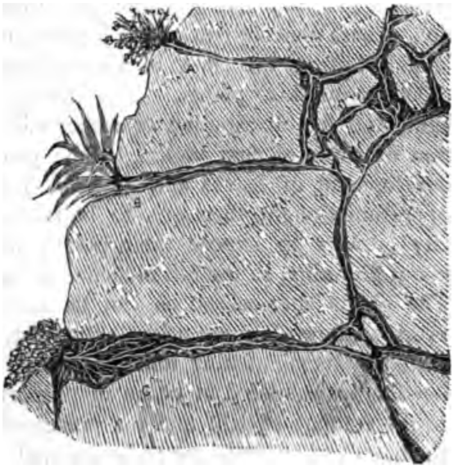


Fig. 1.—A, Silene alpestris; B, Lychnis viscaria; C, Silene acaulis.

" Comparatively few Alpines prefer or su ceed well in horizontal fissures. Thos however, which, like Lychnis viscaria an Silene acaulis, form long tap roots, thri well in such fissures, provided the earth the fissure is continuous, and leads backwa to a sufficient body of soil. Where th horizontal fissures are very narrow (as at fig. 1), owing to the main rocks being contact in places, and only leaving irregu and interrupted fissures, such plants as charming Lychnis (or Petrocoptis) Lagas Lychnis pyrenaica, and others, bearing a preferring hot sunny exposures, do well; many plants that would bear the heat a drought, *if* they could get their roots enough back quickly, would die if placed

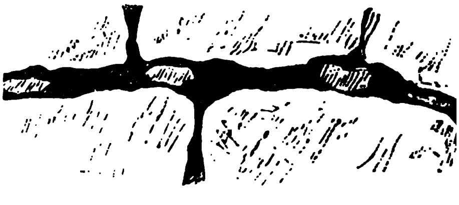
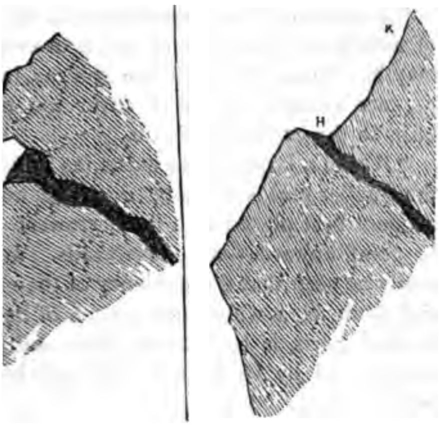
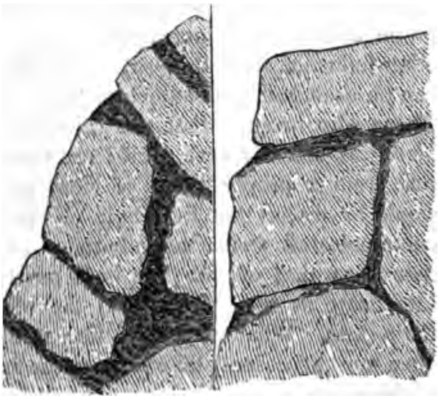


Fig. 2.

fissures, from the paucity of soil and ure near the front; therefore, it is usually , in building rockwork with such fissures, ep the main rocks slightly apart by s of pieces of very hard stone (basalt, grained 'flag,' &c.), so as to leave room good intermediate layer of rich loam, s, or grit, mingled with a little peat. front view of such a structure would be —the dark spaces in fig. 2 being firmly with the appropriate mixture of soil e the upper course of large rocks is ed.

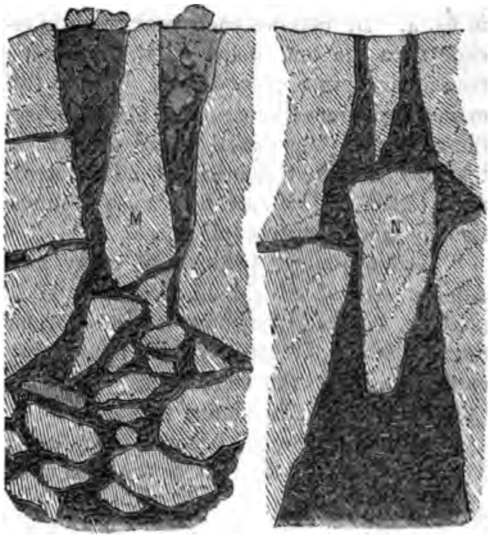


Wrong. Fig. 3. Right.



Right. Fg. 4 Wrong.

As a rule, oblique and vertical fissures oth preferable to horizontal ones; but should be taken with oblique fissures the upper rock does not overhang. A plant placed at G, fig. 3, will often die, when the same placed at H will live, because the rain falling on the sloping face of rock at I will drop off at J and miss the fissure G altogether, while that falling on the sloping face of rock at K will all *run into* the fissure H.



Right. Fig. 5 Wrong.

"There are, however, some plants, like the rare Nothochlæna Marantæ and Androsace lanuginosa, which so much prefer positions dry in winter, that a fissure like G would suit

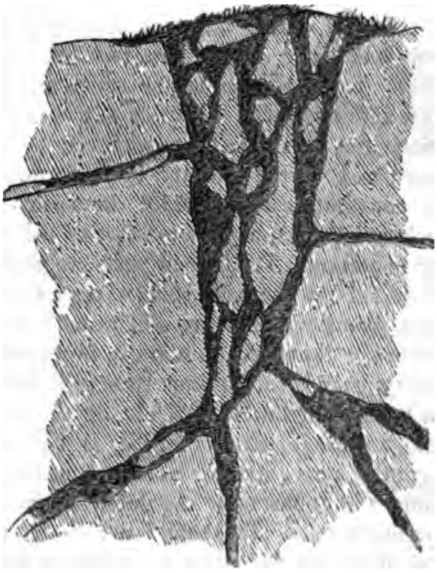


Fig. 6.

them better than one like H. Such are rare exceptions to a general rule.

"The best and worst general forms of steep rockwork we have tried are those indicated in fig. 4. By making each rock slightly recede from the one below it, the rain runs consecutively into every fissure. Where the main fissures reverse this order, almost everything dies or languishes. Care should be taken to have the top made of mixed earth and stones—*not of rock*, unless use is intentionally sacrificed to scenic effect.

"*Vertical fissures* (which suit many rare Alpines best of all) should always, as far as possible, be made narrower at the bottom than at the top. If otherwise, the intervening earth, &c., leaves the sides of the rock as it 'settles,' instead of becoming tighter.

"In M, fig. 5, the soil becomes compressed against the sides of the rock as the total mass of soil sinks; while in N the soil *leaves* the sides of the fissures more and more as the total mass of soil sinks, and almost invariably forms distinct 'craks' (separations between the soil and rock) sooner or later. The same principle applies even to small stones.

"To prevent undue evaporation in the case of such fissures as M, stones, larger or smaller, may be laid on the *top* of the soil (as in fig. 5), care being taken not to cover too much of it, to the exclusion of rain.

"Where a large fissure exists (as in fig. 6), the smaller pieces of stone *in* it are on this account best placed with the narrowest edge or point upwards—not downwards. It will easily be seen that the tendency of the mixed soil, both as a whole and in each of its subdivided parts, is to become more and more compressed by its own weight and by the action of rain."

INFLUENCE OF THE STOCK ON THE SCION.

IT has been asserted that the only influence which the stock has upon the scion is that of a dwarfing or *vice versa* character. In proportion as the scion and the stock approach each other closely in constitution, the less effect is produced by the latter; and, on the contrary, in proportion to the constitutional difference between the stock and the scion, is the effect of the former important. Thus, when pears are grafted or budded on the wild species, apples upon crabs, plums upon plums, and peaches upon peaches or almonds, the scion is, in regard to fertility, exactly in the same state as if it had not been grafted at all. While, on the other hand, a great increase of fertility is the result of grafting pears upon quinces, peaches upon plums, and apples upon the different kinds of paradise stocks. In these latter cases, the food absorbed from the earth by the roots of the stock is communicated slowly and unwillingly to the scion. Under no circumstances is the communication between the one and the other as free and perfect as if their natures had been more nearly the same: the sap is interrupted in its ascent, and the proper juices are impeded in their descent, whence arises that accumulation of secretion, which is sure to be attended by increased fertility. No other influence than this, says physiologists, can be exercised by the stock upon the scion. Those who imagine that the contrary takes place can scarcely have considered the question from a proper point of view, or they would have seen that the whole of the food communicated from the alburnum of the quince to that of the pear is in nearly the same state as when it entered the roots of the former. Whatever elaboration it undergoes, must necessarily take place in the foliage of the pear; where, far from the influence of the quince stock, secretions natural to the variety go on with no more interruption than if the quince formed no part of the system of the individual.

Such was at one period the opinion o writers on this subject; but against this view of the matter various appeals have from tim to time been made. Of these, one of the most recent is the following:—"With regard to the grafting of fruit trees," says a Brazilian newspaper, "it is generally believed that the stock exercises no altering influence over the scion in conjunction with it; but experiments made here testify to the contrary. We have raised a number of seedlings from a tree of the Laranga da terra orange, whose spherical somewhat flattened fruit is very large and sweet, and remarkable for its thick oleaginous rind. Some of these seedlings—which bear good fruits of themselves—were budded; but only two of them so treated produced similar fruits to that from which the buds were taken. The remainder differ materially from one another, and from the parent, and are not recognisable as descendants of one sort. They are all distinguishable from the fruit of the original stock, especially in possessing greater sweetness and, as a matter of course, less acidity. A bud of Laranga da terra worked upon Citrus decumana produced a very peculiar fruit, of an oblong form and large size, and almost flavourless."

The following case is advanced by Mr Goodsall, Nurseryman, Hereford, as an illustration of the power that the graft or bud has, under certain circumstances, of affecting the stock. Mr Goodsall says—

> "Many years ago I conceived that if the variegation of Jasminum officinale could be transferred to J. revolutum, which has a larger and handsomer leaf, it would be desirable. I therefore budded plants of the latter with J. officinale variegatum. The buds appeared plump for a time, and then all died off; notwithstanding, the following year the plants exhibited variegation in several leaves and shoots, continuing even along the young branches; but the variegation of J. officinale was white, whereas on the revolutum it became yellow. However, last year I reversed the experiment by budding the variegated revolutum on the plain officinale, and at the present time the yellow variegation appears on the leaves and young shoots. In this case, also, the buds never grew, though they continued plump for a time. This certainly appears singular, and some of your correspondents may like to try the experiment."

In a paper read the other day at Manchester, Mr Barron notices briefly some of the principal stocks used for fruit trees, and states the conditions under which they can be most advantageously employed. As regards—

> "*Apples.*—1. There is the Crab or free stock, most suitable for large standard trees, and totally unfit for dwarf ones. 2. The French Paradise, which is eminently qualified for producing dwarf fertile trees, and which succeeds best on damp, clayey soils, its roots feeding near the surface. 3. English Paradise, a moderately vigorous-growing stock. 4. The Nonsuch English Paradise of Mr Rivers, which is similar in its effects to that of the French Paradise, producing vigorous but fruitful little trees. It, however, succeeds well on dry soil, which the French does not.

We may add here that those who have seen a plantation of dwarf apple trees which Mr Rivers has at Sawbridgeworth will not soon forget them. They are no larger than currant bushes, and annually bear heavy crops of fine fruit. To Mr Rivers was also awarded a special certificate the other day at South Kensington for a collection of twelve dwarf apple trees. They carried a splendid crop of fruit, and were said to be only two years old, and to be grafted on the broad leaved English Paradise Stock, which was raised from seed at Sawbridgeworth.

> "*Pears.*—1. The Pear, or free stock, which, like the Crab, is again only suited for large trees, excepting in dry soils, in which case, on account of the roots striking deeply for sustenance, it is the most to be recommended. 2. The Quince, which is admirably suited for cultivation in damp soils, through its roots feeding near the surface, is entirely unsuited for forming very large trees on dry soils. Its great recommendation is in its dwarfing tendency and its exceeding fertility. Pears may be grafted on many other stocks, such as all the species of Cratægus, Mountain Ash, Cotoneaster, &c.
>
> "*Plums.*—These are not much influenced by the stock, excepting it be the Damas Noir, which tends to earlier fertility.
>
> "*Cherries.*—1. We have the wild Cherry, which is adapted for large trees. 2. The Mahaleb, the most suitable for dwarf fruiting plants. Plums may also be grafted on Cherries, and *vice versa.* Beyond the fact of its accomplishment, however I can state nothing, as the ultimate results are not known."

From what has just been stated, it will be seen that, as repects dwarf or free growth, stocks have a considerable influence on the trees worked upon them. The Quince, for instance, is remarkable in some soils for inducing Pears grafted on it to yield larger and finer fruit than when grafted on the Pear stock; but this does not hold good in all lands, for in some of the red soils of Devonshire, for example, the Louise Bonne of Jersey, which succeeds so well on the Quince in calcareous soils, even refuses to grow; and consequently, under such circumstances, cultivators are compelled to employ the Pear as a stock. So much in reference to growt and as regards other effects on the scion sulting from the use of certain kinds of stoc we may, we think, safely assert that t Quince most certainly imparts a portion its austerity to some kinds of Pears—a fa readily distinguished by those who kno Pears well.—*Seedsman.*

THE PUBLIC NURSERIES OF PARIS.*

THE first great group of glass houses is span-roofed. The interior arrangements made in them for the convenience of the workmen and for the preservation of the plants in winter are most admirable, and should be adopted by us in all similar instances. We build more hot-houses than any other people, construct them better, and furnish them better; and therefore it is desirable that in disposing them in relation o each other we should employ the most conomical and convenient plan. Every-ody knows how often they are scattered bout without any connexion with each ther, and the consequent additional expense nd trouble. But, even where the errors of the scattering system are guarded again there is seldom an effective means of co municating from one to the other witho going in the open air. We all know ho disagreeable it is to pass from a moist sto to frosty air, from wet gusts to damp gree houses. It is dangerous to tender plan that often have to undergo it unclothed; n can be otherwise than injurious to the heal of those employed in such structures. A these inconveniences are got rid of by th very simple plan adopted in the case of th group of houses, the arrangement of whic the diagram, fig. 2, may serve to explai The plant houses diverge on each side of glass-covered passage, and there is no nece sity for taking the plants into the open a in winter, or for the men who work in th

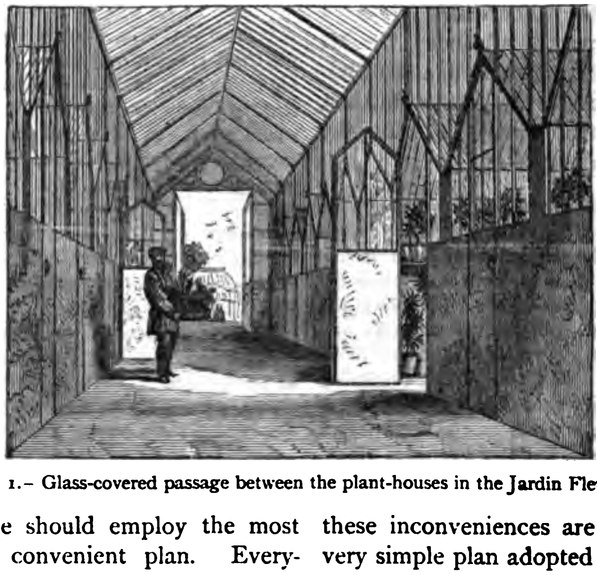


Fig. 1.– Glass-covered passage between the plant-houses in the Jardin Fleuriste.

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* From Mr Robinson's admirable work, "The Parks, romenades, and Gardens of Paris."

s to undergo any change of tempera- for hours at a time. The houses are so ly arranged together, that heating them mes much less difficult than when they eparated. The advantages of the plan so great that I should strongly advise body building a batch of houses for ing or storing plants to adopt no other. graperies with the borders outside it d not be so suitable; but where good ers are made inside it would answer or the vineries or peach-houses might the outer four houses of each block, ng the plant-houses, forcing-houses, &c., e.

ants may be grouped in the passage, e narrow, in half-oval groups between door. In large places, where money is an object, and where the houses on each would be filled with very ornamental imen plants, it would be a capital plan ake the central passage as wide as one e houses. Beds may be placed between doors, in winter garden fashion, and bers run up the roof, thus converting the age into a most agreeable promenade. the better kinds of climbers dependent the roof; a few belts of Oranges and ellias, and some palms and fine-leaved ts here and there, to lend the scene grace and character, I can fancy nothing more agreeable in the way of winter garden or conservatory; particularly as the varied contents of the houses on each side could be seen through the glass ends and doors from the promenade. A wide gutter separates the roof of one house from that of its fellow—forming a passage along which men can freely move to arrange shading, ventilation, or repairs. It will be seen at a glance that easy communication between all parts of the range is secured, that the plants just rooted in the propagating house have merely to be carried across the passage to the house devoted to their further development. The plan is capable of adaptation in various ways to houses either large or small.

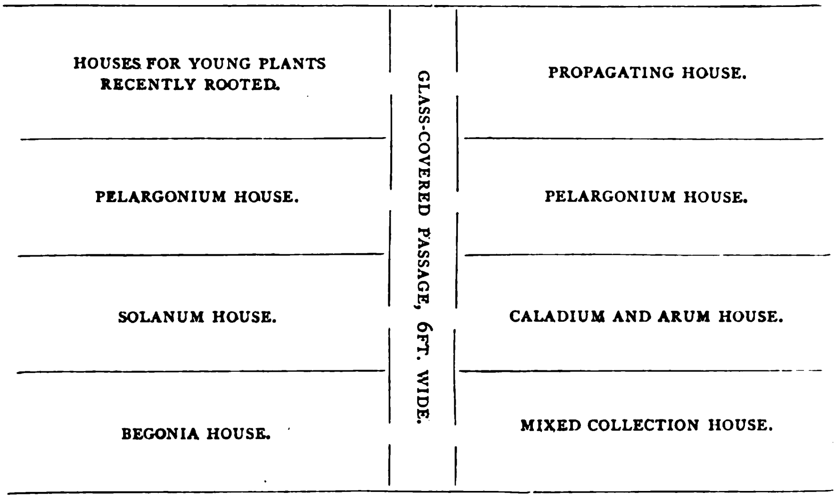

Fig. 2.—Plan shewing the arrangement of glass houses of the Jardin Fleuriste.

One of the houses in the block just referred to is the largest and most perfect propagating house I have ever seen—being more than 80 feet long and 24 feet wide. From this house immense quantities of plants are turned out in the course of a year, many of them being large-leaved Ficuses and plants that are difficult to strike, as well as Begonias, bedding and free-rooting plants. It contains three central and two side beds. The central pits are well elevated, and every space is in active work, the whole presenting a most imposing array of large bell-glasses.

*NURSERY GARDENS IN NEW ZEALAND.**

NO. I.—MR WILSON'S NURSERY.

THESE gardens date their origin from the founding of the city of Christchurch, in Canterbury, some eighteen years ago, and are not only the oldest established, but by far the most extensive nursery gardens in Canterbury; and, if we are correctly informed, they are the largest and best stocked gardens in New Zealand.

They are three in number, and consist of four and a-half acres between Cashel and Lichfield Streets, and four and a half acres between Barbadoes and Madras Streets; whilst the third garden on the Ferry Road, more recently formed and planted, is ten acres in extent, and will shortly expand into fifty acres. At present, therefore, the three gardens comprise about nineteen acres, all in the highest state of cultivation, and upon which from ten to twenty-five workmen are engaged throughout the course of the year. The gardens contain very many thousands of fruit trees, English forest trees, evergreen and deciduous flowering shrubs and plants, and are the source whence has been derived a very large proportion of the fruit trees which now fill the gardens of the province with a profusion of fine fruit, and of the forest trees which now ornament Christchurch, and have created such a remarkably improved appearance in the features of the surrounding country.

To describe these gardens in their order,—there is first the nursery garden in Cashel Street, which is securely enclosed by a very lofty and well-kept gorse fence, within which there is a closely planted line of lofty Australian gums and Lombardy poplars, whose dense foliage and branching arms, completely intertwined, afford the most complete shelter from all winds. Immediately in front of this screen there is a broad belt of fruit trees, running round the whole of the garden, consisting, mainly of apples, pears, plums, cherries, peaches, nectarines, figs, filberts, medlars, quinces, and almonds, besides immense quantities of gooseberries, black, red, and white currants, raspberries, strawberries, and other small fruit. A spacious grass walk, 726 feet long, stretches from the entrance gate to the eastern end of the garden; at right angles to this walk, and at distances of 132 feet apart, the garden is intersected with lofty and well-kept Cape broom fences, thereby forming convenient nursery compartments. These consist of six beds, each 18 feet in width, with 4 feet intervening footpaths. The beds in some of the compartments are all densely filled with a most luxuriant growth of from one-to six-year-old fruit trees, of the kinds which we have already enumerated. Other beds are filled with forest trees, such as English and mossy-cupped oaks, English ash, including some very tall-stemmed ash trees, upon the summit of which some weeping ash are growing gracefully pendent. There are also quantities of the Scotch and English elm; and also, the weeping and American lime trees with mountain ash, horse chestnuts, and swee or Spanish chestnuts, besides hornbeams common and purple-leaved beech trees with Lombardy and black Italian poplars Side by side with some of these will also b found quantities of the Norway and othe maples, besides the well-known and hand some foliaged English sycamore, and th noble leaved Platanus orientalis, or easter plane, some four feet high, and the first, s far as we know, which have yet been grow in New Zealand. We also noticed son beautiful birch trees, about seven feet height, with quantities of English laburnu and Cobbett's acacia or American loc tree. The latter not only makes a ve impenetrable hedge, but, when thinly plante rapidly becomes a lofty tree, and yields fi timber of an excessively hard and most

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* This paper is condensed from the *Seedsman and Nurseryman.*

g character, and largely used in the
of America for the purpose of ship-
ing.
ongst coniferous trees we noticed con-
ble quantities of the Pinus Pinaster
ima, which will yet clothe with luxuriant
the slopes and summits of our driest
ever-shifting sand hills. We were also
ished to notice so many hundreds—we
re we might say thousands—of noble
t trees, from five to twelve feet in
t: these have all been raised from the
nown French walnuts grown and
d so abundantly at Akaroa.

hedge plants we noticed large quan-
of thorns, privets, sweet-briers, thorn
a, English, Cape, and Portugal white
ns, each of which have their respective
for the purposes of protection, ornament,
elter. Leaving forest trees and hedge
s we come to ornamental evergreens
deciduous flowering plants; first amongst
we noticed quantities of the handsome
sh holly, besides some dozens of the
more beautiful variegated hollies, budded
afted upon the common green holly, and
nting the well-known varieties of gold
silver-edged, the hedgehog, and broad-
d Dahoon holly; all of these being the
admired ornaments of all well-kept
nental grass lawns. We were equally sur-
l and delighted to find some hundreds of
noblest of all beautiful evergreens, the
dodendron Ponticum, and other similar
ies of this handsome flowering occupant
glish shrubberies. In close proximity
ese are many hundreds of fine large
s of the common English laurel, and
ly noticeable were a quantity of fine
s of the Laurustinus, esteemed not more
s handsome evergreen foliage than for
mired peculiarity of blooming profusely
ghout the whole of the winter. We
noticed some plants of the well-known
gal laurel, and of the equally familiar
aurel, or sweet bay, and near to these
plants of the Aucuba Japonica, or gold
n tree, with remarkably broad green
s, profusely blotched with golden spots.
also noticed plants of the handsome
climbing and delightfully fragrant Wistaria sinensis, of the broad-leaved Photinia serrulata, and the handsome flowering Weigela rosea, and of the still more handsome snowball guelder rose; with plants of the early spring-flowering scarlet Pyrus Japonica, many hundreds of the Spirea corymbosa, or handsome New South Wales May, besides many other varieties of the Spirea recently introduced from England. Among climbing plants we noticed the Toxicodendron, or poison oak; three varieties of the English ivy; besides several sorts of climbing roses. We also observed some handsome Chinese Arborvitæ, and a quantity of the still more handsome evergreen cypress, besides a number of the most beautiful of all cypresses, the Cupressus Lawsoniana. Our attention was attracted by handsome specimens of the beautiful Pinus insignis, and of the equally ornamental and lofty Pinus excelsa. Amongst coniferous plants in pots we observed quantities of Pinasters, Scotch and spruce firs, stone pines, and many other varieties of handsome growing pines, cedars, cypresses, junipers, and other similar plants and trees. We further observed plants of the American Osage orange, of the evergreen and deciduous fruit-bearing barberry, of the pomegranate, of the handsome rose acacia, of the sweet smelling Buddlea globosa, with fine plants of the Salisburia adiantifolia, or maidenhair-tree, with quantities of box trees, and Siberian, Persian, and white lilacs, together with broad-leaved American thorns; besides a large number of budded plants of the double scarlet, double white, and single scarlet thorns, the latter, especially, from its great profusion of brilliant scarlet bloom, forming one of the most handsome flowering trees for a grass lawn.

The nursery in Madras Street is surrounded with a sweet-brier fence, immediately within which a lofty row of blue gums and poplars afford excellent shelter. The border in front of these is planted all round with some 400 of the newest and best sorts of pear and plum trees. The pears comprise over 40 varieties of the choicest new French varieties, many of which are now in full bearing. The remainder of this nursery-ground is mostly filled with young grafted or budded fruit trees, with large quantities of damson and mussel plums, with some thousands of Lombardy and black Italian poplars, common willows, weeping willows, and the lofty timber-growing variety known by the name of the Huntingdon willow. Prominently noticeable, however, amongst all the productions of this garden are some 25,000 English ash trees, in remarkable health and vigour, and standing from 3 to 10 feet high.

Passing over many other interesting plants in this garden, we proceed to the more recently formed nursery garden of ten acres on the Ferry Road. This also is bounded by a gorse fence, and planted with a broad border of forest trees and evergreen shrubs; shelter in all cases being a first consideration in all Mr Wilson's gardening. The land is also divided into compartments with Cape broom fences, and each of these compartments is filled with forest trees, comprising ash, oak, elm, beech, lime, Cobbett's acacia, maple, and sycamore, besides many thousands of seedlings of Pinus maritima, and Pinus sylvestris, or Scotch fir. We were also glad to notice about a thousand young trees of two years' growth of the Ailanthus glandulosa, or new silk-worm tree. Near these, a large quantity of the Gleditschia triacanthos, or three-spined acacia, were growing luxuriantly. Portions of this ground are also devoted to the growth of vegetable seeds, and especially to the growth of thorns for hedges. Upon one and a-half acres of ground, one hundred and seventy-five bushels of haws had been sown last spring, and these have grown into at least one hundred and fifty thousand fine thorns, which will be fit for transplanting during the ensuing winter. It is, also, upon a portion of ground alongside of this nursery, where the remarkably productive crop of Hallett's pedigree wheat is now growing.

We have now very briefly described Mr Wilson's nursery grounds, which, we are fairly bound to say, are the result of diligent industry, governed by a large share of intelligence; and whilst these nurseries must be admitted to have been an immense acquisition to Canterbury, their owner has been one of the most successful of the early settlers, and has for a period of fourteen years conducted a highly useful occupation largely beneficial to the interests of this province of New Zealand.

The Stable.

GH LEAVES FROM THE NOTE-BOOK OF A VETERINARY SURGEON.

[Continued from page 274.]

CHAPTER XVI.

LSE or unnatural presentations are so very various in character, that one arcely lay down rules for guidance, and st confess my practice in such cases has but very limited, and for which, indeed, very unsuited, as far as regards manual bilities, owing to my arms being very . However, the cases in which I have called, whatever kind of "presentation" d itself, I have had the animal at once d on her back, and held at the head, ame as holding a colt for castration, nd legs firmly tied to the sides at the of the stall, if necessary, the fore legs ogether; then lifted the hind parts up lacing a bag under, place beneath a batten of straw, and the fœtus was then got turned to the natural position, and ht forth, by placing the animal as above iving the necessary instructions. I have some very bad presentations thus easily uickly overcome. After the calf is got , I generally gave a pint of warm ale, a little ginger, and, in a few hours after, usual full dose of physic; feeding on es, gruel, &c., for a few days, and kept very quiet, in cases of this owing to the violent throes of the l, and even in cases where no assistance uired. The uterus or womb is sometimes led directly after the fœtus, the return of is a very difficult operation, and re- g a great deal of patience, more espe- if it has been protuded for some time, s much swollen and covered with dirt. animal is in a state of great excitement, he throes continuing, it was my practice to bleed largely and administer a dose of opium, 2 drachms of the powder or 2 ounces of the tincture. If the animal is laying down, have her raised up; get a large sheet and hold up the womb by placing a man at each side, get some water and sponge the womb clean from all dirt; if the placenta is not detached, it must be done gently with the fingers, and if much bleeding follows, wash well with cold water, and apply a little spirituous tincture or brandy and water, and by the help of another get the lower portion well up and level, press it forward with both hands well spread out, and by patience and firm pressure it will quickly return with a loud clack. During the operation, a person should hold the cow by the nose and horns. After it is returned, some one should keep the sheet folded up and firmly pressed against the bearing until the throes have ceased, or until a proper truss is applied, which is made by having a web collar on the neck, a surcingle of the same, both fastened together above and between the forelegs; then a crouper from the surcingle to the tail, and tied between the hind legs to the lower part of the surcingle, fixing three or four strips across the vagina, so as to allow of the escape of the water and excrement. A temporary one can soon be formed from the harness in the stable, and a few long strips of sheeting, pack twine, and needle. Bran mashes, gruel, and quietness, are all that is required; but if the bowels seem costive in a few hours after, give the usual dose of physic. Should the throes continue, with febrile excitement, the cow had better be again bled, and the usual full dose of physic given directly, taking care to have your truss strong and secure, especially across the vagina or bearing; the other cows being kept from going near her. When once the womb has protruded, the cow should never be again put to the bull, but fattened for the butcher. I have seen cases in cows having this mishap when feeding, and ostrum or heat has come on, the womb has again protruded; but in this case, from its smallness in size, is very easily returnable; and a truss, as before mentioned, had better be kept on for some time, and the animal fattened in the stall. Bleeding from the womb sometimes takes place, especially after difficult parturition; but I never met with any cases requiring particular treatment, further than keeping the animal quiet and paying attention to the system in general; but in severe cases, cold cloths kept across the loins will be useful, the animal's hind quarters considerably raised, avoiding the giving of any astringent medicines, as they will be more hurtful otherwise to the digestive organs than in any way beneficial in stopping the hemorrhage from the uterus; cold cloths may be placed in the vagina, cold water to drink, and perfect quiet.

CHAP. XVII.

In continuation of my remarks upon Puerperal Fever, I have to say that attention ought to be paid to the udder from the first commencement of the attack; flannel cloths, steeped in very hot water, then wrung, should be applied to the udder when the animal is down.

The animal may continue down for some days, and will have to be turned gently over three or four times a-day. By careful nursing, and taking particular care as to the state of the bowels, that they do not get costive, by dissolving a good handful of common salt in the gruel, and which is not a bad tonic as well, the animal will soon get up of herself. Should an attendant be present when she is making efforts to get up, he may grasp the tail and so help her a little, but I do not approve of half-a-dozen setting to work with ropes, &c., and trying with main strength to force her up, which only "worrits" the poor animal; and, in fact, she endeavours, as it were, with all her strength, to counteract all endeavours to get her up. Good nursing, the animal kept dry and clean, the mild tonics as mentioned, and for some time after the cow is up and fast recovering, being not too hasty in feeding,—these are essentials. Above all, let me impress on the mind, the paramount necessity of keeping the bowels in a soluble state by the means before stated, or by bran mashes and boiled food, rather than by giving too much grass, if at the season of the same. By this time, the secretion of milk will be much impaired, but by fomentations to the udder, and gently drawing the teats, milk will gradually return.

The third stage of this formidable disease I may safely call the closing scene or winding up. The animal is found down, lying at full length, scarcely able to lift the head, and if she does so, with a jerk, up and down, as if she would knock her head to pieces; at another time thrown back along her side, with heavy deep sighs and moans; the eyes are very much bloodshot, watery, swollen, as if they would start out of the socket; frothing at the mouth; tongue hanging out, at times drawn in the mouth, natural; abdomen much swollen; grinding of the teeth now and then. The pulse is very irregular, for a few seconds full and bounding, again can scarcely be felt, as if fluttering, so feeble; then again in a few seconds full and bounding. Such is the peculiarity of the symptoms, so changing that at one time you would think reaction for the better is taking place, and in a few minutes again as if all was over. The treatment I adopted in this last stage, and which I found to be very beneficial and beyond my expectations, is as irregular as is the state of the pulse. If the animal is able to swallow any liquid tolerably easy and natural, which I ascertain in the first place by administering a little water or gruel, I consider there is still some hopes of the case. I bleed, but not to any great extent, according as the pulse bears it; then give a full dose of physic with croton oil as before, and in addition, 2 ounces of aromatic spirit of ammonia, ½ an ounce of spirits of nitre; horning down gruel every two, three, or four hours, with smaller doses ammonia, say ½ an ounce; and in ours repeat the physic, applying the cation and mustard along the spine, fore alluded to. After the bleeding irst dose of physic, with the frequent injections meanwhile, and truly, how- inconsistent, the treatment seems well ed to an animal in a high state of and inflammation. At the same time is a debility existing, or a comatose that seems to require it. However, by verance in the above treatment, (no bleeding), the bowels have responded, y careful nursing, attending to the udder, g, watching the bowels, as before alluded eping the animal as comfortable as pos- and not disturbing her more than is sary, the case ultimately may turn out On the other hand, if the animal can- swallow, and the liquid appear to run the œsophagus or gullet spontaneously, itself, as it were, without the effort of owing, which will be known by a gurg- ound, treatment in this stage is of no whatever.

CHAP. XVIII.

ws sadly out of condition, and in a weak state at the time of calving, will times be found down, and unable to p; but in this case there is no febrile ment, there is little or no secretion of ; in fact, it cannot be expected, owing want of proper nourishment, not being ient for the *fœtus in uteri*, far less pplying blood for a proper supply of Treatment in this case is simply tion to dietetics, good nursing, turn- he animal over three or four times y, plenty of dry litter, boiled food, loths to the udder, as a means of en- ging the secretion of milk, in conjunc- with plenty of good succulent food, well d and given cold, but fresh, not too much d at once so as to get sour, paying atten- o the bowels; and, if requisite, a gentle of physic, gentian, and ginger, may be in gruel or strong chamomile tea. e are generally very tedious cases, and ery often a considerable time before the al is able to get up. Attention must be paid to any sores about the haunches, knees, and hocks, keeping them clean, and applying zinc ointment.

Before taking leave of this subject, I may allude to a disease I have often met with unconnected with calving, but so similar in the symptoms, particularly that of dropping, that perhaps an allusion to it here may be useful to cattle owners. This disease occurs during pregnancy, and when the cow is in full milk, and it may be when the time is about half gone. I do not remember the exact period. However, we will premise the cow is milked in the morning, mid-day, or night, and, as far as is observed by the attendants, seems all well; or if she seems a little duller than usual, the quantity of milk much diminished from the usual quantity (all dairymen meet with these variations during pregnancy); but so long as she seems to feed as usual and *chew* her *cud* not much notice is taken, unless, or until something more serious occurs, which, perhaps, is at the next milking time, when the cow is found lying down in the field and cannot be got up. I am now speaking of cows in good full condition, and which are large milkers.

Symptoms.—The cow is found down, and cannot be made to make any effort to get up, and, perhaps, is found ruminating as usual. The breathing is quickened; the horns and ears hotter than usual; the pulse is full, in fact more so than in pure health, and quietness of the general system, but not so quick as in health; in other words, very full and very slow; such a pulse indicates *congestion*, the eyes are prominent, full streaks of bloodshot, the milk is suspended, or at least little can be drawn away, and the bowels are costive.

Treatment.—A full blood-letting and dose of physic, embrocation applied to the loins, and in a short time the animal will get up of herself, and manage to be got home, but very slowly. Fomentations to the udder, bran mash, gruel or chilled water, in 12 hours. If the bowels are not relieved, give a half dose; in a few days the milk returns, and the animal is fit to be turned out. Such is the general termination of the case if the animal is timeously seen to and so treated. But in cases where the usual cordial is given, "as it's only a chill," or perhaps gin and pepper, and half a dozen men set to work with poles and ropes to get her up by main force, or, perhaps, placed on a rude litter, and drawn home, the case turns out a very lengthy and serious affair, and must be placed in the hands of a very experienced practitioner as a fixed rule of treatment cannot be lai down; but, as a general rule, the foremen tioned will not be far wrong, every attentio being paid to the animal's comfort, as the case is now likely to be a protracted one, and she will likely remain down for some time. These occur in cows in first-class condition, which are in general large milkers.

CLIPPING CATTLE AND HORSES.

ALTHOUGH the clipping of cattle has frequently been discussed by agricultural societies in France, the following, by a practical farmer, is, we believe, the first report yet published, which gives the result of actual experiment on the subject.

In the year 1867 (writes our authority) I caused a dozen bullocks to be clipped, and put up to fatten along with others of the same age and breed, and no sooner were they shorn of their coats than they began to increase in weight, far more rapidly than the unclipped cattle, which had been fed and otherwise treated alike.

In November, 1868, I recommenced the experiment, taking care to weigh the beasts on their arrival from the Department of the Meuse, where they had been brought. The twelve selected were of the same breed, and about the same weight and disposition. The six I had clipped weighed together about 2760 kilos. (1 kilo. = 2 lb. 3 1-5th oz., or 2¼ lb. nearly); the other six 2808 kilos. I placed them in the same shed, subjected them to the same hygienic influences, and fed them exactly alike. They received daily the following rations :—

	kilos.	gs.
Beet root	9	300
Mixture, consisting of equal parts of clover (second cut), bean-straw and wheat-straw (chopped)	5	0
Crushed linseed cake	5	0
Salt	0	100

After being kept sixty days on this food, the clipped bullocks weighed together 3258 kilos., and had, therefore gained about 83 kilos. a-head. The unclipped bullocks, on the other hand, weighed together 3138 kilos., and had consequently gained 60 kilos., or 23 kilos. a-head less than the others.

The clipped cattle ate their rations during this period with much greater avidity than the unclipped; indeed their provender disappeared so much faster, that one would have imagined the food had not been equally distributed.

At the expiration of the second month I increased the quantity of linseed cake by 1 kilo. a-day for each bullock, and after an interval of another sixty days the animals were again weighed. The clipped beasts then weighed 3714 kilos., equal to an increase of about 1 kilos. a-head, and the unclipped 3540 kilos., equivalent to an increase of 62 kilos. Thus the difference i favour of the clipped bullocks for the third and fourt month amounted to 14 kilos.

A month later I scaled them again, and found th the clipt cattle weighed 3960 kilos., equal to an i crease of 41 kilos., whilst the unclipt advanced 3756 kilos., representing an increase of 36 kilos. T balance in favour of the clipt bullocks for the fi month was, therefore, 5 kilos.

To sum up the results of the above experiments, would appear the clipt bullocks added to their weig during the first two months 23 kilos. more than t unclipt; second two months 14 kilos. ditto; fi month 5 kilos. ditto; or, during the whole five mont 42 kilos. ditto.

As the clipt bullocks increased in weight in a mu greater ratio during the first two months than later o we may conclude, that to insure, in fattening cattle, constant rate of progress, it would be necessary to cl them more than once.

I had the bullocks washed down several times, fi with soap and water, and afterwards with chilled wa alone, and I attribute the thriving condition of t animals on losing their coats, in no small degree to t greater facility afforded me of keeping their skins p fectly clean.

When the skin is free from scurf and dirt, perspi tion through its pores takes place without hindran and thus is kept up that equilibrium between functions of exhalation and absorption, with wh the processes of digestion are so intimately connect Irritation or itching, from which cattle frequen suffer so much, is prevented, and the work of assi lation goes on undisturbed.

My experience in clipping has not, however, confined to fattening beasts, but extends also to working oxen and farm horses. With regard to working oxen, I found that clipt animals are more lively and active, performed their work with greater ease, and ate their food with greater relish than the unclipt ones; and this induced me to try the effect of the system on farm horses. Accordingly, I caused a dozen of the latter to be clipped, and, on comparing their condition and working powers with the rest, had the satisfaction of observing that the operation had been attended with the same results as in the case of the bullocks.

After a few weeks' further trial of the experiment, I decided to have all my horses clipt, and subsequent experience having confirmed me in the opinion, that without their coats they work with greater ease, and keep in better health on the same amount of food, I still adhere to the practice.

Instead of employing a "professional," I let my carters do the clipping, and pay them for the job at the rate of 2 francs a-day. Though a little awkward at first, they soon acquire proficiency, and seldom require more than three days for a bullock, or one for a horse.

The Dairy and Poultry-Yard.

GOOD QUALITY IN BUTTER AND CHEESE.

THE question is often asked, "Why is it that in this age of improvements and inventions, when the science of agriculture seems to be progressing at such a wonderful rate, we are not always able to secure a choice flavour in butter and cheese?" The answer is quite obvious; at least, to those who care to interest themselves in the matter. We have only to enter any of those close, badly ventilated, dark, filthy cowhouses, situated near our large towns, and we will have no difficulty in giving a sufficient explanation.

Much has been said and written, and, indeed, much has been done to remedy those ill-constructed places, which are little better than pest houses (so bad are some of them that delicate women have been known to faint away in them in hot weather); but, until we can get an entire revolution of the present system, we need never be surprised if doubtful-looking produce continues to find its way into the market for sale. The good results which have attended all improvements in this direction should induce us at once to remedy the evil entirely. In some places it is most delightful to come across private dairies, entirely open at one side, so as to let in a continual current of fresh air; cool, and kept scrupulously clean. In this case, milking is made a pleasure to both animal and milkmaid, and the produce is of the richest quality.

Milk, it is well known, is very susceptible to become tainted by any powerful odour which pervades the apartment in which it is situated; for instance, the common elder (Sambucus nigra), which is often placed before dairies because the powerful odour of the blossom keeps off flies in summer, is also known by the same odour to affect the taste of the milk. If such is the case, need we be surprised that the filthy state of the cow-house does much to spoil the quality of the milk, and consequently give a bad flavour to butter and cheese.

In a paper read at the annual meeting of the Canadian Dairymen's Association, Mr Willard gives the following advice as to the manner in which the process of milking should be conducted. He says:—"Preparatory to milking, the teats ought always to be well washed with a sponge and cold water. This is not only a cleanly habit, but it keeps the teats in good order, and frequently prevents inflammation, and in certain cases restores the flow of milk by warm applications. A cow that has always been treated kindly will generally stand quietly, and appear to enjoy th operation. Milking should always be done by on and the same person, and I am in favour of women, a being more tender, cleanly, and more patient of tempe than men."

Some of Mr Willard's remarks are very valuabl from their thoroughly practical nature, but as we inserted his paper in a recent number of the Magazine, i is quite unnecessary for us to dwell upon it at an length. That the soil of the site on which the cow-hous is built, should be as free from damp as possible, an drains should be made to pass across the site, by whic the excess of water will be led away, independent o those drains required to lead off the liquid exuviae o the animals.

The lighting of the cow-house is also of the greate importance; indeed it is difficult to over-estimate th importance of a large supply of light—especially direc light—to our animals; and yet it is strange to sa that just on this point a great many people stumbl Many cow-houses are often made purposely dark, b this is a great mistake, and so far from doing good t the animals immured in them, it leads to painful re sults in the aggravation, not only of known disease but sometimes in the inducement of those which a as baffling to the skill of the surgeon as they a mysterious in their origin. Windows should b placed in the front of the cow-houses as large a the windows of an ordinary dwelling-house, an in number not fewer than the proportion of one t every three single stalls.

Then, again, what can be of more benefit to th animals than good ventilation? The minimum amou of space required to keep a cow in healthy conditio is 1400 cubic feet, and it has been calculated that th cow, inspiring eight times per minute, and inhaling a each inspiration 100 cubic inches of air per minut requires 48,000 cubic inches of air per hour. Th quantity of carbonic acid gas created by the respi tion of this volume of air per hour is 1 cubic foot, co taining 2 oz. or thereabouts of solid carbon. To thi impurity of the air of a cow-house is to be added tha arising from the cutaneous perspiration of the animal which, with pulmonary perspiration, results in th evolution of a weight of watery excreta, equal to 15 lb four hours. Add to these sources of im- ırising from the liquid and solid excreta ıe animals, and which the most perfect the most scrupulous cleanliness cannot ome idea of the state of the air in a badly w-house may be formed.

therefore, that unless more attention is paid to the lighting, cleaning, and proper ventilation of cow-houses, we can never have that standard of excellence in the quality and flavour of butter and cheese which it is so desirable to obtain, and which we only find in the best regulated dairies. How many of our dairymen will see this to be as much to their advantage as to the benefit of the community?

RSEY OR ALDERNEY COWS.—WHAT CAN ONE DO.

ınds, Jersey and Alderney, whence these were imported, lie contiguous, and though that Jerseys are larger than Alderneys—vn-coloured, white and black in colour—black and white—yet we think there is nce between the breeds. Six years ago purchased a so-called Alderney cow. ıwn-coloured and white, with a black with calf, but the journey (only 40 miles) o lose her calf. It was her first one, and a permanent injury to her. In process of l another calf, and her milk was delicious, s thick as a "leather apron," and of the ur, the butter yellow as cowslips, fragrant morn. She supplied a family of seven ınd made 8 lb. of butter each week. The so much in taste from common milk that eives the difference. A child, three years rced to remain a week or so at a neigh- count of illness in the family. He refused milk provided for him, and they were procure the Alderney's milk daily for his aid, "I want *clear* milk, not milk and his exactly expresses the difference between ıilk and that of all other breeds.

for that was the Alderney's name—on the ear had twin calves—a bull and a heifer. taken from her on the third day, and fed sh milk for four weeks, and for four weeks milk which had "set" twelve hours. After eks we made 8 lb. of butter weekly, and ıe family with milk, besides having ice- ınly once a week, and sometimes oftener. re upon the average 20 quarts per day season. But the twin calves proved too er strength, coming so soon after her injury nmencement of her maternity. She had f the following season, and falling of the cked her. By another year she was fatted —made excellent beef—better sirloin steaks ere never eaten—still we had petted her so much that we could not taste her. Oh, it seemed cruel to slay her.

Her twin calf Juno at two years of age became a mother. She is a dainty cow, nearly white, with dun colour and black spots, gentle as a trained colt; small ankles and limbs. A much smaller cow than Spotty, and has never given as much milk, but what she gives is very rich. She calved a year ago in July, made all the butter we used during the summer—from five to six lb. per week. All winter she averaged three lb. a week—was farrow—and during this season, though she has given only five to six quarts of milk daily, she has averaged three and three-quarter lb. of butter a week. She will calve in April with her second calf, but will not be four years old till July. Spotty was nearly four years old before she had her first calf. We think that Juno in two or three years will equal her in milking qualities.

A neighbour of ours has an Alderney cow eight years old, which gives twenty quarts of milk per day. Cream is used lavishly in the family—eaten by the teacupful by one member in the place of cod-liver oil (blessed substitute!) From eight to ten lb. of butter are made weekly. The quality and aroma of the butter made from these cows exceeds all others. Its texture is like beeswax—it works readily; no streaks appear; the butter-milk is easily pressed out. Its hardness is a speciality; it rarely requires ice to keep it hard on the table. In all respects the milk, cream, and butter of Alderney or Jersey cows, far surpass that of all other breeds. They can, if properly cared for before the second calf comes, *i.e.*, milked well up—say to within four or five weeks of calving, be kept in milk nearly eleven months of the year. They are timid and shy—love to be petted—will not give down their milk if beaten and kicked; ***must have kindly treatment to do well.*** But this applies to all breeds. Alderneys require no better feed than other cows. Juno has a good pasture, plenty of water, and two quarts of provender at this season when the pasturage is rather low.

HOW AND WHEN TO MILK.

AS a general rule, farm men dislike to milk, and consequently seldom do it well. In the dairy districts, where milking is one of the most important labours on the farm, it is not difficult to get good milkers, but in the grain districts it is easier to get ten men who are good teamsters than one who can milk rapidly and clean.

It is not so important to milk rapidly as it is to keep up a steady flow. To milk fast one day and slow the next is injurious. If the milker becomes tired, it is better to rest when he has finished one cow and before beginning another, than to rest or lag during the operation. An irregular milker will soon spoil a cow. She will not give down her milk steadily. On the other hand, a cow that is milked steadily will give down her milk freely and with a steady flow Such a cow can be milked in five minutes. We have a cow that gives about 10 quarts at a milking, that we have milked in four and a-half minutes. After letting a poor hand milk her a few weeks we could not milk her clean under seven minutes. We have little doubt that a poor milker, although he strip the cow clean will cause her to give less milk. This is the general opinion of dairymen, and is, doubtless, correct. It is certain, if a cow is not milked clean she will gradually fail in her milk. And it is equally certain that the last drawn milk is much richer than the first drawn. Experiments shew that the stripings contain four or five times as much cream as the rest of the milk. As a check on careless milkers, it is best to have a member of the family or some trusty person go over all the cows after the milking is finished, and strip every drop of milk from the udders. With an empty pail this is little trouble. Some object to the practice on the ground that "the cow should be milked clean at once." This is true, but it will be found that when the practice of stripping is regularly adopted, the cows will be milked much cleaner than where a perverse or careless milker knows he is in little danger of being detected. We have known a good and usually reliable man to leave 4 quarts of milk in the udder! In milking, it will be found that "even the best of men are none the worse for a little watching."

It is not easy to describe the operation of milking. It can be learned only from example and practice. Our own method is to have a three-legged stool, as being firmer than the one-legged kind sometimes used, and to hold the pail up from the ground firmly between the knees. We do not like to see a man stick his head against the side of the cow. There is no advantage in the practice, and the position is not as good for the free action of the muscles of the arms and hands as to sit upright. Grasp the teats firmly with all the fingers, if possible, and close the upper finger a shade earlier than the lower ones, in order to keep the milk from being forced back into the udder. The principal work will be done by the three lower fingers. Some good milkers pull down on the teats, but this is unnecessary. A steady contraction of the fingers is all that is required; the pressure forces out the milk, and when they are opened the elasticity of the teat forms a vacuum, and a fresh supply rushes in, which is forced out as before. This is all there is to milking. It is one of the simplest and pleasantest of operations, and we can but think that the reason so many farm men object to it is based on prejudice and perversity.

Where but few cows are kept, it is seldom convenient to milk at the same hour at night as in the morning. As a general rule, cows are milked before breakfast, say from half-past four to half-past five and at night from half-past six to half-past seven. At night, therefore, we get the milk from fourteen hours, and in the morning from only ten hours. Professor S. W. Johnson, in his "Notes on Recent Progress in Agricultural Science" in the *American Agricultural Annual* for 1868, gives the results of some experiments, which shew that the milk, after an interval of

10	hours	contained..........	4.36	per	cent.	fat.
11	,,	,, ...	4.31	,,	,,	,,
12	,,	,, ...	3.97	,,	,,	,,
13	,,	,, ...	3.97	,,	,,	,,
14	,,	,, ...	3,51	,,	,,	,,

When the above system is adopted, therefore, the night's milk would, other things being equal, be about 20 per cent. poorer in butter than the morning's milk. Dr Voelcker, in his admirable article on milk, in the *Journal of the Royal Agricultural Society* says "The popular opinion ascribes to morning's milk better quality than to that obtained in the evening. My results do not favour this all but generally received opinion. As far as my experience goes, the result depends on the quality and quantity of the food which is given to the cows four or five hours before milking. If the supply of food given in the day time be good and plentiful, and that furnished in the evening be unnutritious and scanty, the evening's milk is of the better quality. On the other hand, when the cows get a good supply of rich food in the evening, and are stinted or fed upon very watery food during the day-time, the evening milk is the poorer. . . . Out of thirty-two samples taken in the morning and the evening of the same day, I found in eight cases the morning milk poorer than that of the evening, in four cases, richer whilst in four there was no perceptible difference."

The fact is not mentioned, but the probabilities ar cows were milked at the same hours morning ıing. Where, as in this country, they are ıter at night than in the morning, the "popuon" that the morning's milk is richer is correct, ı by the above experiments quoted by Prof. ւ.

composition of morning and evening ys Prof. J., "exhibits a constant, though ifference, which, in general, consists simply aining *half a per cent.* more fat at night he morning. In the morning's milk this fat ed by almost precisely the same quantity ." These cows were milked at 6½ to 7½ d 5½ to 6½ p.m. In other words, an hour the morning than at night, and, consequently, ıt's milk was the richer in butter. That the ntains a less per-centage of butter when the is delayed an hour or two seems to be proved. dairy districts, there is no difficulty in milkthe same hour night and morning. It is a and important part of the daily work; but nly a few cows are kept it is not so easy. During harvest, for instance, we have known cows not milked until eight o'clock in the evening. That this is an injury to the cow and a loss to the farmer, cannot be doubted. Our own practice is to attend to the horses and feed the pigs, &c., before breakfast, and milk immediately after breakfast—say six o'clock; and at night to milk as soon as the teams can be put in the stable and fed—say 6½. This makes only half-an-hour's difference.

It is also essential to treat the cows with the greatest gentleness. Never suffer a harsh word to be used or permit loud talking. To kick a cow should be an indictable offence. A cow is susceptible to kindness, and will surely repay it. Women make the best milkers, and a cow will give more milk when habitually milked by a woman than by a man. If our barnyards were kept as clean as they should be, we should see more farmers' wives and daughters drawing rapidly and gently the rich milk from our generous cows. Where dairying is not the special branch of farming, let the good wife have all the butter money, and do not borrow from her and forget to pay.

ODOURS INHALED BY DAIRY COWS.

readiness with which fœtid odours are coneyed to the milk of a cow through her breath, Arnold in a communication to the *Albany or*, I have seen well exemplified this summer. he 1st of June I lost a calf suddenly, by its too much whey. The carcase was ordered ut-of-the-way place, and nothing more was of it. In a few days the milk in my vat was be tainted, and alternately tainted and pure ery change of the wind. The cans coming to ory were critically examined for the infected at to no purpose. Happening to cross my when the wind was westerly, the scent of was detected and traced to the calf I had lost. een dropped short of its intended destination, where the northwest wind swept the stench pasture, which was inhaled by the cows and d to their milk. Though the quantity was not ough to be discovered at the time of milking, as enough so to infect the milk that by the was worked up, it was very apparent in the ngy feel and strong odour of the curd. Upon overy of the cause the taint was at once oband nothing more of it appeared.

year there was a great deal of trouble with the n a neighbouring factory. The curds often badly and smelled badly, and resulted in imcheese, which occasioned much loss to the and vexation to the maker. If he could not ood cheese out of any milk that was brought to , of course, was complained of as incompetent for his position; and he, in turn, complained of the milk, and especially of the milk of a certain large patron, who furnished the milk of between forty and fifty cows. The milk of this patron, it was urged, seldom came to the factory without having a very strong and unnatural smell to it when the cans were opened, and that it just about spoiled the curds in the vat where it was worked; but the season closed without fully settling where the blame belonged.

This year the trustees determined to retrieve the lost credit of their factory, and employed, at a heavy salary, the best cheese-maker they could obtain. But it was not long before the troubles of last year began to be repeated. The milk of the patron complained of last year, though not so bad as formerly, was still sadly "out of flavour," and gave the manufacturer much trouble. It sometimes was as good as any milk that came to the factory, but oftener than otherwise it had a disagreeable stench.

Satisfied where the trouble belonged, and failing to discover its origin by interrogating the patron, the manufacturer determined to go to the premises and search for the cause, and the writer was invited to participate in the search. We met at the farm, June 26th, looked over the herd for sick cows, saw them driven slowly to the yard and neatly and quietly milked. So far there was nothing that we could seriously complain of. The milk appeared to be good, and though it smelled a *little* strong, we should not have suspected it of being bad from its odour when first drawn from the udder; but it proved that its journey of two miles to the factory developed its bad smell. We also looked over the pasture for stagnant water, foul weeds, or coarse grass, that might sicken the cows or make them feverish, but found nothing of the kind. The water was pure and the feed good. But we did find in the middle of the pasture a *dead horse*, that was slowly consuming with a very offensive odour. This appeared to us a sufficient cause for all the mischief. The cows were occasionally turned into another pasture, and, very likely, would some days keep out of the range of the carrion stench, and thus the occasional purity of the milk could be accounted for. Though the dairyman did not think it possible that carrion could produce such results, we insisted on the burial of the horse, and all trouble ceased therewith, and has not since re-appeared. The cause of the bad milk is fully settled.

But some reader may ask, if it was the stench from the dead horse that tainted the milk, how happens it that the milk of this patron was as bad and even worse, last year than this? We found upon inquiry, that last year there were *two* dead horses in the pasture, and that they lay there unburied all summer, and hence the milk was bad the season through. It has been estimated by several who are familiar with the circumstances, that these three horses have occasioned a loss to the patrons of the factory of over 1000 dollars. This is a pretty large sum to be paid by one factory for tuition—but "experience keeps a dear school," &c.

With a view of saving others a similar expense, these facts are offered to your valuable Journal, and it is hoped that dairymen will read and remember, for (from considerations of health as well as profit) it is high time such facts were understood, and that dairymen should be familiar with the general rule, that odours are taken from bad air as well as from bad food; that the scent of carrion or a foul stable is as readily and as certainly carried to the milk through the breath of a cow, as those of an onion or a leek when taken into her stomach.

ROUP IN FOWLS.

A CORRESPONDENT of the *Albany Cultivator*, writing on the above subject says:—Roup is a somewhat general term for most diseases, but is most properly applied to a cold. The fowl becomes drooping, fœtid matter running from the nostrils, swollen eyes and disordered excrement. The symptoms most prevalent in roup are difficult and noisy breathing, or a kind of rattling in the throat, beginning with what is generally termed gapes. The head becomes feverish and much swollen, and the eyelids livid, with decay of sight, and even total blindness. There is considerable discharge from the nostrils, and even from the mouth, of fœtid matter, at the commencement thin and limpid, but afterwards becoming thick and purulent and very offensive. As secondary symptoms, the appetite is all but gone, except for drink; the crop feels hard to the touch, and the feathers are staring, ruffled, and without a healthy gloss. The fowl sits moping and wasting in corners, always apparently in great pain. In this stage of the disease it is supposed to be infectious, and whether so or not, it is certainly proper, for cleanliness' sake, if nothing else, to *separate* the diseased from the healthy ones, to prevent the disease from spreading. They should, above all, be kept warm and have plenty of pure water.

Treatment.—In general, we would advise the killing of a roupy fowl at once, unless it be valuable, as the risk of its contaminating the whole flock is great. At all events, let it be removed from the yard as soon as discovered. Warm, dry bedding and nutritious food are the first essentials to recovery; in addition, the frequent removal of the dried discharge from around the eyes and nose by warm bathing the nostrils with Castile soap-suds as often as necessary, and the swollen eyes with warm milk and water. In the way of internal remedies, we find that nearly equal numbers recover under various modes of treatment.

"For grown fowls affected by the roup," says Mowbray, "warm lodging is necessary, and even the indulgence of the kitchen fire or the bake-house. Wash the nostrils with Castile soap-suds as often as is necessary, and the swollen eyes with warm milk and water." We have tried the following remedies, viz., a peppercorn in a pill of dough, the three following days the patient being much chilled. Afterward bathe the swollen parts with camphorated spirits or alcohol an water. As a finish to the cure, give sulphur in th drink, or a small pinch of calomel in dough thre times a-week.

Dr Bennett says: "For roup and all putrid affections, I confidently prescribe the following, and consider it the only true treatment:—Take finely pulverized fresh-burnt charcoal and new yeast, of each thre parts; flour of sulphur, two parts; flour, one part water, quantity sufficient; mix well, and make int boluses of the size of a hazel nut, and give one thre times a-day. Cleanliness is no less necessary tha warmth, and it will sometimes be desirable to bath the eyes and nostrils with warm milk and water, o suds, as convenient."

Mr John Giles says:—"As soon as the disease i discovered, if in warm weather, remove the infecte ones to some warm place; then give a dessert spoo ful of castor oil; wash their heads with warm Castil soap-suds, and let them remain until the next mornin *fasting;* scald for them Indian meal, adding 2½ ounces Epsom salts, for ten hens, or in proportion fo a less or greater number; give it warm, and repeat th dose in a day or two if they do not recover."

MARKETING POULTRY.

T is no great wonder that poultry raisers complain of the small price they get for their birds when ey are sent to market; but it is a greater wonder, at e time when the market is glutted with poultry, that any of the lots that are exposed sell at any price. ch specimens of poultry as are seen are enough to r ever disgust one with the whole feathered tribe as ticles for food. Old birds and young birds; fat rds and lean birds; birds dressed and undressed, d some half-dressed; roosters that have stood guard ver the poultry-house, strutted about the farmyard, d waked up the family at early dawn for the last n years; roosters that have crowed till their vocal rgans have been destroyed, as news boys' are apt to e, and the spurs on whose legs remind one of antient attle-pikes; old hens that have clucked to call gether a dozen broods of chickens, and are only illed to prevent their dying of old age; chickens ozen and thawed, and jammed into all conceivable apes; chickens whose colour is blue, white, and ariegated—ah! it is no marvel that the market is ull, and that prices rule low.

But if the birds themselves are bad, the packages are nfinitely worse—old flour barrels that have taken eir turn in holding bran, potatoes, and garden vegeables; boxes that have stood out of doors until they re weather beaten and blackened—these are the unviting packages in which poultry are often sent to arket, thinking thereby to tempt the eye of the picure who may be searching for fine spring chickens.

A little reason would convince any one, that all is is wrong. Absolutely poor birds should never be nt to a city market at all, with the expectation of alising anything from them. Six bad specimens of oultry, in a box of a hundred good ones, will ruin e sale of them as first-class birds. Better send them to pot" at home, or feed them to the crows, than to nd them to market.

One of the principal things that stand in the way of rmers realising a good price for their poultry, is the rong time it is sent to market. As a rule, the oorest time to sell poultry in a great city, is the eriod of the winter holidays, say from after August ll a week after Christmas. The market is then suplied with choice game, while every butcher's stall is ung with most tempting cuts of stall fed beef. Some xtra poultry will sell then at fancy prices, but there is ally no demand for the great quantity of ordinary irds that come in every day, both in cars and in farers' waggons. They are disposed of at prices conlerably lower than is obtained for ordinary beef.

As a rule, live poultry sells the best in the market, and this is particularly the case with spring chickens that are likely to present a scrawny and bony appearance when dressed. The crates in which they are sent need not be made of expensive material, and they should not be heavy, as this would add to the cost of transportation. They should have a good floor, and strong partition or end pieces; but the sides and top may be formed of laths. Shippers often err in not having their coops roomy enough to accommodate the birds, and it is often the case that many die in consequence.

To ensure dressed fowls keeping well, they should have no food or drink for at least twelve hours before they are killed. For the same reason, it is not considered best to draw them or cut off their heads, as it is the air that goes inside of the carcass, that prinpally causes the flesh to become tainted. If the head is cut off—and chickens look best beheaded—it should be done with a sharp knife, or hatchet, and then the blood should be carefully washed off, the skin drawn forward over the neck and tied. If the skin of fowls is of sufficient strength to permit of their being plucked without tearing, it is better not to scald them, as their appearance, after a little time, is injured thereby. The plucking should commence as soon as the bird is dead, and before it becomes cold. Remove the wing and tail feathers first, then the smaller ones. Pin feathers may be removed by means of pinchers.

If it is desired to kill the birds without beheading them—and turkeys are most salable that have the heads on—a cord may be tied around the wings, fastening them to the body; then hang them on a pin, and with a sharp knife sever the under part of the neck, or simply cut the large blood vessels in it, being careful not to sever the neck bone. In this manner the bird will die, and no blood will come on the feathers.

The birds, like larger animals, should hang in a cool place, till they become cold, before they are packed; otherwise they would soon become tainted. The packing should be done in a nice clean box that will help, and not injure sale of the contents. If there are several sizes or kinds of fowls, they should be sorted and packed in separate packages; the aim being to have the lot in each box as nearly uniform as possible. In placing them in the boxes, they should all lie in the same direction, in layers, with the breasts turned up. If you have clean rye, or unbroken wheat straw, a little may be put between each layer; otherwise, use nothing between them. Pack them as closely as you can, without pressing them out of shape. Poultry treated in this way will sell, if sent to market at the right time.—*Prairie Farmer.*

The Naturalist.

LARCH GRUBS.

THE surface grubs, those destructive pests of the Nursery, are unusually numerous this autumn; and we have had several inquiries as to what they are, where they come from, and how they are to be got rid of, or compelled to restrict their ravages within moderate bounds. Of these communications, we select the following:—

> "I send you up a box with a few lively examples of the Larch Grub.
>
> "I think his name is "Agrotis segetum," and he becomes, in his perfect state, a large beetle. Not having any work on Entomology, I cannot describe him further, but no doubt you will be able to give him a proper certificate of character. All I know is, that one of them is to be found at the root of all the young seedlings which have been destroyed. They lie about half-an-inch deep in the soil, curled up, through the day; and it is in the evening, and through the night apparently, that they come up and do the damage.
>
> "You will observe from the seedlings, which I now send, that they eat nearly through the stem below the foliage, and a little above the ground, and, in general, the top of the plant drops off.
>
> "It would be very desirable to find out some means of preventing the depredations of this creature. Nothing seems to check him, except removal from the scene of his labour, and it is tedious work catching him.—*W. B. S.*"

The grubs which accompanied the above communication, are those of different moths, and not beetles; but by far the greater number are seemingly those of the Common Dart Moth, Noctua segetum of Linnæus, and the Agrotis segetum of Curtis (fig. 1).

A few that presented a less cylindrical orm, and more flesh tinted or pinkish colour an the preceding, are grubs of the Heart-and-art-Moth, N. exclamationis (fig. 2); and one, y much the largest of the lot, was the grub of the Yellow-Under-Wing Moth, Triphœna, ronuba. Many others, besides the above, of which some belong to widely different generæ, are termed surface grubs or surfa caterpillars, by cultivators, from their o attacking plants at or near the surface of t ground—sometimes a little above, and so times a little under the same—but the th here named are generally the most comm as well as the most troublesome; and, though they all manifest a liking for parti

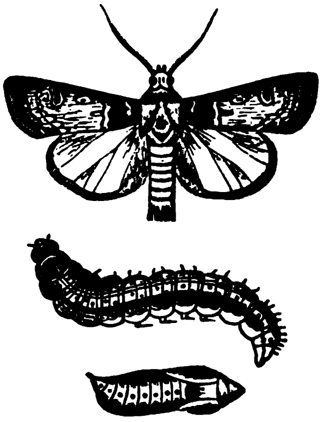

Fig 1.—Noctua segetum, *L.*—Common Dart Mot Caterpillar, and Chrysalis—Natural Size.

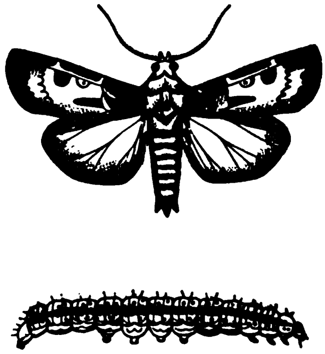

Fig 2.—Noctua exclamationis, *L.*—Heart and D Moth and Caterpillar—Natural Size.

nts, yet they are by no means exclusive ir tastes, but feed upon those of very nt flavours and qualities—such as the , cabbage, and others of the brassicæ ; spinach, beet, leeks, lettuce, endive, es, grass; stocks, carnations, golden r, feverfew, young larch, and other nur rops, &c., &c.

their moth or perfect state, they lie con l under thick foliage during daylight, whence they fly forth in the evenings, April to September, for the purposes of g and procreation. They deposit their eemingly singly, and in the earth, beside plants as will afford nutriment for the , which are no sooner hatched than ommence the work of plant destruction, g, and moving actively, at a speed of 12 inches per minute, from a devoured to h plant at night, but returning and curl emselves up under the surface of the on the approach of daylight, till they to perfect size. When they enter upon ntermediate stage of their existence, ury themselves several inches deep in cavities, or cells, where they remain h the winter in the chrysalis state, till warmth of ending spring or summer, sue forth as perfect moths.

ong the natural insect enemies of the grubs, centipedes, or "Maggie with ndred legs," are perhaps the most effica for keeping them in check; but it is in rd creation that the most successful exist, for regulating "their natural e of power." In performing this, rooks titled to the first place; and after them apwings, jackdaws, blackbirds, thrushes, l as many others of similar as well as r sizes, have each their share in prevent excess of plant-devouring grubs; the s of which are most severely felt in t gardens, nurseries, and other cultiva ounds in or about towns, from which st grub-driving birds are systematically ughtlessly excluded. The nocturnal of the moths protect them in a great e from birds, but it not unfrequently s that an early out Yellow-Under-Wing the notice of a house sparrow in a summer evening, which darting from its perch gives rapid gyrating, but not always successful, chase to this largest, strongest flying, and handsomest of our common moths. Climatal, or weather agencies also act largely, both in promoting and in impeding their multiplication.

Among the artificial modes of keeping surface grubs under, that of protecting their bird enemies deserves primary attention; and with it may be included the keeping of tame gulls, lapwings, ducklings, jackdaws, and others that will search for and devour them. The following additional methods of effecting this desirable end, have also been practised with different degrees of success; but some of them must be very cautiously applied, more especially to peculiarly constituted crops, and such as are easily injured by strong saline, or other inimical agencies. Water, heated to such a temperature as will destroy the grubs without injuring the plants, will bring the former out of their concealments; and that more speedily if mixed with about a pound of soap to 16 gallons of water; after which they may be gathered off the surface. Lime water, and soot water, applied either hot or cold, are each productive of similar effects; and that more especially when the ground has previously been very dry. Soot spread over the surface to the depth of an inch, will prevent the moths depositing their eggs if applied in time, or if the grubs are previously in existence, it will either kill them or drive them elsewhere. The same will be effected by the application of salt and water, but few plants stand this without suffering injury. A decoction of tobacco leaves is fully as efficacious and less hurtful. The same may be said of urine, dunghill drainage, and most other strong liquid manures. Caustic lime, applied in the form of dry powder, is also very hurtful to the grubs, but in the event of rain coming it requires to be repeated; the best method, however, is to scatter it on about midnight when they are all exposed, and it will then be still more effectual if the weather is quiet, and the ground surface moist with dew. Hand picking is the most certain mode of getting rid of them, and it is by no means such a difficult or expensive one as many would suppose. By a little training, women and children soon become expert at detecting the haunts of the enemy and scratching them out with sharp pointed sticks, large nails, or better still, with three-pronged iron table-forks. With the aid of lanterns they may be still more easily picked off the plants at night.

Much has yet to be learned regarding the habits, and tastes, as well as distastes, of these and other insect pests; for, although these are known, or supposed to be known, by a few naturalists, almost nothing regarding them, except their devouring propensities, is known to those who are most interested in this particular branch of Natural History. Let, if not all, at least many of such, therefore, at once set about collecting the grubs, keeping them, as nearly as possible, under natural circumstances, and watch their transformation and other changes with especial care. In this way alone will they be able to acquire that knowledge which will lead to the best modes of destroying them. The before-mentioned modes are mostly alone applicable in the destructive stage of the enemy's existence; but with mere expertness the evil may be arrested in the earlier stages. Thus, entomologists, in order to secure fine specimens of the rarer night moths, entice them to particular spots by sprinkling a mixture of molasses and rum over leaves or other surfaces, and then scattering a little powdered sugar over all. Some such mode might be discovered for the wholesale entrapping of destructive moths. The predilection of moths for light might also be taken advantage of to lure them to destruction, by burning exposed gas jets, paraffin lamps, or other flames, during quiet dark nights in places which they frequent. Or certain plants may be discovered which they are particularly fond of, by cultivating which they might be diverted from more useful ones, and by this concession to their tastes the grubs would be much more easily caught. The Golden-Feather Pyrethrum we find to be remarkably attractive to them; and having recently planted out a pot of that curious grass the Cynosurus elegans, we were surprised to see it cut down as if eaten by rabbits: a closer inspection shewed, however, that another enemy had done the mischief, and on looking under it we found no less than eight grubs, comprising all the three kinds previously mentioned, but that of the Yellow Under-Wing the most predominant. Since then we have re-examined the plant twice, and picked in all seven other grubs, while many kinds of grasses and other plants growing around remain untouched.

A smart frost which has just occurred in many places had the effect of sending these grubs down to their winter quarters, so that they are not likely to do further mischief this season. The reason that they cut the young larches higher above the ground than they do softer plants, seems to be, that the lower portions have become too hard or woody for their mandibles.

THE SEA BIRDS PRESERVATION ACT.

THE destruction of any creature or thing that serves in any way to conribute towards the enhancing of the beauty our islands, is sure, sooner or later, to give ause for regret to a large proportion of overs of nature, pure and simple. The enroachments of civilisation year by year are obbing us of many an interesting relic of lden times, many a picturesque gem of scenery, the like of which it is hard, if not impossible, to find elsewhere. Few admirers of nature's beauties would care to look further than the Scottish Highlands for the perfection of landscape; but perch up a modern villa, staring with stucco and red brick, on the breezy hill-side, or at the head of the glen, and the picture loses all its beauty forthwith. The strides taken by modern improvements

lled—are so rapid now-a-days, that it
; all who love nature for nature's sake
continually looking ahead, or the out-
come too late, for mischief in this
as speedily consummated as it is irre-
le. Decisive remonstrance, and, on
n, active resistance is necessary. Steps
e taken immediately that the danger is
l, or we shall find nought but regrets to
consolation for our loss.

ll who take pleasure in contemplating
auties of our coast scenery, it will be
l that without the bird life it would be
d of half its charm. Visitors to the
e would find many of their favourite
sadly altered were the white-winged
' their pinions laving," missing from the
. The mingled beauties of towering
ad dashing wave would scarcely be the
o them if the wild cries of the kitti-
and guillemot were hushed. Many
round the coast owe their influx of
in a great measure to the attractions of
intless sea-fowl that increase the beauty
erest of the cliff scenery in the neigh-
od; and what would be the feelings of
hoolboy spending his holidays at the
e who found scarce a feather at which
ct his fowling-piece? But these, after
mere minor considerations, and hardly
of a place in the same scale with those
should influence every one who takes
rest in the welfare of the community
lly. The real serious reasons which
so loudly for the preservation of our
ds dealt not with questions of senti-
r scenery, but with that of the general
and the discussion during the passage
Bill for the Preservation of Sea-Birds
h the House was one of very general
t.

some years past the gradual decrease
birds round our coasts had been ob-
with serious concern by naturalists, and
atter had assumed an aspect which
for immediate investigation. With this
the "Sea-Birds Preservation Bill" was
it before the Lower House, by Mr
opher Sykes, which provides that, from
of April to the 1st of August, the destruction of either sea-fowl or their eggs is made a penal act. There were clauses in the original Bill allowing fishermen and the poorer inhabitants of villages and towns on the coast, to kill such birds as they require for food at any time of the year, whilst naturalists, in their turn, were to be allowed, during the above term, to recruit their collections with specimens of both birds and eggs. These clauses appeared reasonable enough, and it is hard to see any impediment to their efficient working, and yet the clause which related to the killing of the birds for food met with determined opposition, and it was withdrawn, as well as the clause giving permission to naturalists to take birds at any season. The destruction which has so diminished their numbers was not brought about by being captured for food or as specimens for museums. The evil specially to be remedied by the Act consists in the wanton slaughter of the birds at nearly all the great breeding resorts, such as Flamborough Head, Ailsa Craig, the Bass Rock, Lundy Island, &c. At many places whole tracts of rocks used to be covered with netting whilst the birds were sitting on their eggs, hundreds were taken at a time, their necks wrung, and the carcases consigned to London dealers for hat-plumes and feathers. The nests were, as a rule, left untouched, the eggs to rot, and the young brood to perish of hunger. This destruction of late years developed into a regular trade, and a very flourishing one it has proved, for the prosecution of it is not attended with any great difficulty, there being a ready market, while the profits were considerable. Had this trade been suffered to be carried on any longer, a very few years would have sufficed to depopulate our cliffs. Mr Sykes's Act comes not a whit too soon, and there are but few who will not heartily support it.

Little is known by many of us of the great and general usefulness of sea-fowl. The majority are given to looking at them merely in the light of pretty denizens of the coast, without which the cliffs and shore would strike one as bare and desolate. And yet, seafaring men will tell a very different tale. They will tell us how, in fog and gloom, many a vessel and fishing-boat have been warned of the close proximity of the rocks by the sea-bird's scream; how, without their aid in guiding the fishermen to the shoals of mackerel, herring, or pilchard, the boats would all too often return empty to the harbour; and surely these are no questions of sentiment to be easily passed over. The Act might, perhaps, bear one slight alteration: the "close time" might be limited to three months. The young birds are all well off the nest by the end of June, and there is no especial reason for the term to extend beyond that time. With this trifling reservation, we wish Mr Sykes's Act the success it so richly deserves.

The following is a copy of the Act:—

Whereas the sea birds of the United Kingdom have of late years greatly decreased in number; it is expedient therefore to provide for their protection during the breeding season:

Be it enacted by the Queen's most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same:

Definition of Terms.

1. That the words "sea birds" shall for all the purposes of this Act be deemed to include the different species of auk, bonxie, Cornish chough, coulterneb, diver, eider duck, fulmar, gannet, grebe, guillemot, gull, kittiwake, loon, marrot, merganser, murre, oyster catcher, petrel, puffin, razorbill, scout, sea-mew, sea parrot, sea swallow, shearwater, shelldrake, skua, smew, solan goose, tarrock, tern tystey, and willock; the word "sheriff" shall include steward and also sheriff-substitute and steward-substitute.

Season during which Sea Birds shall not be Killed.

2. Any person who shall kill, wound, or attempt to kill or wound, or take any sea bird, or use any boat, gun, net, or other engine or instrument for the purpose of killing, wounding, or taking any sea bird, or shall have in his control or possession any sea bird recently killed, wounded, or taken, between the first day of April and the first day of August in any year, shall, on conviction of any such offence before any ustice or justices of the peace in England or Ireland, or before the sheriff or any justice or justices of the peace in Scotland, forfeit and pay for every such sea bird so killed, wounded, or taken, or so in his possession, such sum of money not exceeding £1 as to the said justices or sheriff shall seem meet, together with the cost of the conviction; provided always, that this section shall not apply where the said sea bird is a young bird unable to fly.

Home Office, &c., on application of Justices, may vary such Period.

3. The Home Office as to Great Britain, and the Lord Lieutenant as to Ireland, may, upon application of the justices, in quarter sessions assembled of any county on the sea coast, extend or vary the time during which the killing, wounding, and taking of sea birds is prohibited by this Act; the extension or variation of such time by the Home Office shall be made by order under the hand of one of Her Majesty's Principal Secretaries of State; after the making of which order the penalties imposed by this Act shall in such county apply only to offences committed during the time specified in such order; and the extension of such time by the Lord Lieutenant shall be made by order to be published in the *Dublin Gazette*, and a copy of the *London Gazette* or *Dublin Gazette* containing such order shall be evidence of the same having been made.

Persons offending against this Act may be required to tell their Names and Abodes.—Penalty for refusing.

4. Where any person shall be found offending against this Act, it shall be lawful for any person to require the person so offending to give his Christian name, surname, and place of abode; and in case the person offending shall, after being so required, refuse to give his real name or place of abode, or give an untrue name or place of abode, he shall be liable, on being convicted of any such offence before a justice of the peace or the sheriff, to forfeit and pay, in addition to the penalties imposed by section 2, such sum of money not exceeding £2 as to the convicting justice or sheriff shall seem meet, together with the costs of the conviction.

Application of Penalty.

5. One moiety of every penalty or forfeiture under this Act shall go and be paid to the person who shall inform and prosecute for the same, and the other moiety shall, in England, be paid to some one of the overseers of the poor, or to some other officer (as the convicting justice or justices may direct), of the parish, township, or place in which the offence shall have been committed, to be by such overseer or officer paid over to the use of the general rate of the county, riding, or division in which such parish, township, or place shall be situate, whether the same shall or shall not contribute to such general rate; and, in Scotland, to the inspector of the poor of the parish in which the offence shall have been committed, to be by such inspector paid over to the use of the funds for the relief of the poor in such parish; and, if recovered in Ireland, such penalty shall be applied according to the provisions of the Fines Act (Ireland), 1851, or any Act amending the same.

As to Trial of Offences committed within the Admiralty Jurisdiction.

6. All offences mentioned in this Act, which shall be committed within the jurisdiction of the Admiralty,

eemed to be offences of the same nature and he same punishments as if they had been l upon any land in the United Kingdom, be dealt with, inquired of, tried, and deter- any county or place in the United Kingdom the offender shall be apprehended or be in in the same manner in all respects as if they actually committed in that county or place ; y information or conviction for any such offence ce may be averred to have been committed : high seas ;" and in Scotland, any offence d against this Act on the sea coast, or at sea he ordinary jurisdiction of any sheriff or jus- e peace, shall be held to have been committed unty abutting on such sea coast, or adjoining and may be tried and punished accordingly.

ffences committed on Boundary Waters, Prosecutions may be in either County.

ere any offence under this Act is committed in or upon any waters forming the boundary between any two counties, districts of quarter sessions or petty sessions, such offence may be prosecuted before any justice or justices of the peace or sheriff in either of such counties or districts.

Extent of Act.

8. The operation of this Act shall not extend to the island of Saint Kilda.

Power to Her Majesty, by Order in Council, to exempt parts from operation of Act.

9. It shall be lawful for Her Majesty, by an Order of Council, where, on account of the necessities of the inhabitants of the more remote parts of the sea coasts of the United Kingdom, it shall appear desirable, from time to time to exempt any part or parts thereof from the operation of this Act ; and every such Order shall assign the limits of such part or parts aforesaid within which such exemption shall have effect.

The Country Gentlewoman.

RATIONALE OF THE SEVERAL PROCESSES EMPLOYED IN COOKERY.

BY THE LATE MRS PARKES.

BOILING.

BOILING consists in keeping the food for a sufficient time in water heated to the boiling point; if the water does not quite boil, it is called *simmering*. This mode of cooking is so common a process, and so familiar to every one, that (as Count Rumford observes in his Essays) "few probably take the trouble to inquire how, or in what manner, the effect is produced. The cook knows from experience that if the meat remains immersed in boiling water a sufficient time, it will be *done*, as it is called in the language of the kitchen; but if she be asked, what is done to it, ten to one but she will be embarrassed to find a satisfactory answer.

In boiling the flesh of animals, considerable chemical changes are effected. The gelatine, which is always more or less solid in the raw meat, is dissolved by the water, while at the same time the albumen, a principle analogous to white of egg, and which is soft in the raw state, is consolidated. When the boiling has been effected by water quite at the boiling point, and the boiling carried on very fast, this is apt to wrap up the fleshy fibre, cause the albumen on the outside to set solid, and to prevent the access of the heat to the interior: hence, boiling fast hardens the meat; and when cooked in this way, it will be too much done on the outside, while the interior will not be done enough. The albumen begins to coagulate at 164 deg., and at 212 deg. becomes firm. In large concerns, if various-sized joints are boiled together, the small ones will be done before the large; for the time of boiling a joint must be proportioned in some degree to its size. A degree of heat somewhat under 212 deg. or *simmering*, is most proper for making meat tender. Meat to be well boiled, should be put into cold water, that the heat may penetrate gradually to the centre; but there are a few exceptions to this rule; fowls and white meat generally require the water to be a little warm. Soon after the boiling commences, a scum arises, which consists of a portion of the albumen with some fat from the outside; this is to be carefully skimmed off.

It is very important that all cooks should be thoroughly acquainted with the facts, that what constitutes boiling properly, is simply, the conversion of water into steam by its being heated to 212 deg.; and that water cannot be heated higher in open vessels; all fuel employed to raise the heat above that point, is wasted in merely raising steam. Some imagine that by using much fire, and making the water bubble much, it is made hotter in proportion to the noise and motion it makes. Using much fire will cause the water to evaporate, or boil away faster, but it will be no hotter; and as the cooking of the meat properly depends upon the temperature and not the quantity of the water, the meat will not be done by boiling fast; on the contrary, in many cases it will be hardened, as was explained above, and will be longer in doing. By too rapid boiling, not only is the meat rendered harder, but much of its savoury juices are thus evaporated and lost. The great art in boiling, therefore, for economy and good cooking, is to keep the

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* Continued from page 382.

iust under the boiling point; and after : boils, it is amazing how little fuel ect this: all beyond that is waste.

;e joints of meat, as rounds of beef, legs of mutton, &c., are best boiled in er or some vessel over a closed fire- as it is easier to regulate the heat in anner than with a kitchen range; on :count, boiling by means of steam is ageous for economy. In boiling in it is sufficient if the joint be quite d with it; there is nothing gained by a vessel; indeed, when that is small, the becomes a kind of broth that may be

As the water wastes by evaporation, ıt be replenished by the addition of :old water, but better by warm water if at hand.

iving directions for boiling vegetables, is sometimes a little confusion, some nending soft, and others hard water. ın only be cleared up by attending to :mistry of the subject. Soft water has er solvent power than hard; and when ect is to extract the juices of vegetables, ıter must be used; as, for instance, making of tea or barley-water; but he juices are not to be extracted, but 'ed in the vegetable, then hard water)er enough, as containing salts which its solvent powers; accordingly, we e that the cook throws a handful of to the water in which she boils her bles, which has the effect, although ıly she is not aware of it, of making it

Vegetables to be digestible should be oiled; and some recommend boiling n two waters. An analogous observa- made in boiling meat, which is more ıd tender when hard water is employed hen soft is used, because the solvent of the latter extracts too much the)f the meat. With respect to fish, as ss after boiling is a desirable quality, r salt water is decidedly the best; and oks put salt into the water, to prevent ı being soft.

STEWING.

ing differs from boiling in this, that the heat is never to be raised to the boiling point, but only to a very gentle simmering, with a very small quantity of water. Of course, it requires much longer time to cook in this manner; but in stewing, the texture of meat is rendered more tender; the gelatinous parts are more completely dissolved; and instead of a considerable part going into the water, as in boiling, the whole of the juices are preserved in the stew, which is therefore very nutritious. Dr Prout is of opinion, that one of the operations of the gastric fluid is not only to dissolve the aliment taken into the stomach, but to cause its combination with water preparatory to the decomposition which it is to undergo, in order to be separated into those elementary principles from which new combinations are to be afterwards prepared by the animal organs; now the process of stewing effects a good deal of this, and therefore leaves less for the operations of the stomach. Stewing is, therefore, found to be not only a very perfect mode of cooking, but also very economical, because a very small quantity of fuel properly applied, is sufficient to keep up the simmering for a great length of time. In Continental cookery, this method is very much practised, and some of their contrivances are highly deserving of imitation, particularly by the working classes, and others with whom economy of fuel and time is an object.

SOUP.

In treating, in this place, on the making of soup, it is not our intention to encroach upon the province of the cook. Our object is to consider it generally as a particular mode of cooking, and chiefly to point out some chemical principles connected with it, which should be understood by those who are desirous of examining the subject with a view to public objects.

Soups may be described as decoctions, more or less strong, of animal and vegetable substances, generally of meat with vegetables, and seasoned with salt, spices, &c. They may be made in an infinity of ways; there is no end to the combinations of meat, fish, vegetables, spices, and mucilage, with water; but of all meats for making soup, beef is esteemed one of the best.

The gelatine of raw meat is softened by the heat, and is dissolved by the water; but not so the albumen, that being insoluble in water. Soup, therefore, contains the first of these principles, but not the latter, which remains attached to the meat. Besides the gelatine, soup made with vegetables contains also the soluble principles extracted from them, of which mucilage is the most abundant. Both the gelatine and the mucilage combine readily with water, and likewise with each other; but the fat of the meat, which melts with the heat, will not, as is well known, unite readily to water; by means of mucilage or starchy matter, however, oil and water are made to unite, as happens in what is termed by apothecaries an *emulsion*. Thus almond emulsion is formed by beating up almonds with water or some other fluid; the oil of the almonds is made to combine with the water by means of the mucilage and starch of the almond. In the same manner, much of the dissolved fat in soup, is made to unite, and prevented from rising to the surface, by means of thickening added, which consists of flour, rice, oatmeal, or some such material, containing starch and mucilage: and thus a good deal of the fat is made to unite with the soup; what refuses to do so, and rises to the surface, should be skimmed off. Dr Kitchener recommends, in order to save time, that the soup should be made the evening before it is wanted, and when it is cold the fat may be removed from the surface, which, when clarified, is useful for all the purposes of dripping; and Beauvillier observes, that this is the best of all fats used for frying.

In making soup the operation should be conducted very slowly, to give time for the above combinations to take place; and the heat should always be under the boiling point of water, or what is termed simmering.

It is the opinion of physicians, that the nutritive powers of soup had been over-rated, and likewise those of jelly prepared from animal substances which consists of coagulated gelatine. A very small quantity of solid gelatine, when dissolved in water and cooled, causes it to gelatinise, or set into a jelly; and an erroneous estimate has been formed of the strength of soups by observing their forming a jelly when cold. Gelatine likewise is considered as less nutritive than albumen; but it is the first only that is found in soups, as we have stated; the albumen is retained in the meat. Hence soups, generally speaking, cannot be considered so nourishing to stomachs that can digest solid food; but as gelatine can be digested by persons of weak stomachs, who cannot take more substantial sustenance without inconvenience, soups are very proper for certain invalids. Notwithstanding these opinions, which are no doubt correct, we have the examples of France, Germany, and other Continental nations, as well as Scotland, in favour of the nutritive power and wholesomeness of this kind of cookery, and there is no doubt that the converting a small quantity of animal food into soup with vegetables is by far the most economical way of using it; and it is to be wished that the strong prejudice that prevails in England against it, particularly among the working classes, was removed.

The bouillon of France is a kind of soup or stew, well known to every family there by the term *pot au feu*, and forms the dinner, and often the breakfast, of a large proportion of the inhabitants of Paris. The manner of preparing it is as follows:—An earthen pot, with a cover, called a *marmite* is provided made to hold from one to seven pounds o meat. A sufficient quantity of lean mea (*bœuf maigre*), usually part of the leg o shoulder, according to the family, is put int this vessel, which is then filled up with col water, say about five pints of water to on pound and a-half of meat. The pot is the placed on the hearth close to the wood fir and generally upon the hot ashes. When begins to simmer, or boil gently, the scu which is thrown up is carefully removed fro time to time with a spoon, which requir three-quarters of an hour before the whole thrown up, and the meat and water cleanse from every impurity. A carrot, half a parsni turnip, an onion, a little celery, or, in short, ny vegetables in season, are then added, ogether with salt and spice. After these additions, the pot remains covered at the ire, and is kept just simmering for six hours nore, hot water being supplied in the room of what is evaporated. Length of time appears to be essential to the perfection of this soup; and all who are acquainted with French soups acknowledge their excellence.

Soup can be made from bones alone; and though this information may not be of much importance in English domestic economy, where it is seldom practised, still it is an interesting subject, and some useful application may be made of it in certain situations. The composition of bone consists of a solid form of certain earthy salts, chiefly phosphate of lime, inclosing a little cartilage and abundance of gelatine. Cold water has scarcely any action on bone; but by maceration in water a long time, the texture becomes more loose and open, and the gelatinous part becomes gradually softened. Boiling water acts considerably upon bone, when reduced to small pieces by rasping or bruising. The first effect is to dissolve and separate the natural oil, which rises to the top, and when cold, concretes to a suety fat. The water dissolves a portion of the gelatine, which composes a very considerable part of the substance even of the driest and most compact bones.

Soup made of gelatine from bones was used some years ago in the hospitals of Paris; and, notwithstanding the public opinion against it, was said to be sufficiently wholesome; but of late its character has declined, and it is not considered nearly so nutritive as soup made in the ordinary way from meat. In fact, as has been stated, gelatine has of itself but little nutritive power; and it was owing to this having been overrated, that many errors respecting soup were propagated. We are the more desirous of pointing out the inferiority of this preparation of soup, lest any person might entertain erroneous views on this subject.

WHOLE-MEAL BREAD.

"IN a multitude of counsellors there is safety," says the proverb. But we have been forcibly reminded of the converse of the saying by the perusal of two papers on the subject of bread. Both the issuers of these documents are anxious to benefit their species, not forgetting their own pockets, by inducing the public to adopt their views, and, as a natural consequence, to consume their goods. The first advocates the sole use of whole-meal bread, and takes the popular method of telling us that white and fermented bread is the sole cause of "all the ills that flesh is heir to," supplemented, of course, by the "drugs and chemicals prescribed by the medical profession," to remedy a state of things entirely brought about by their not approving of whole-meal bread as the daily food of all. This man will doubtless have many believers, because there is unfortunately no more ready method of gaining public notice among a certain class than by the abuse of those who risk life and spend time and money in entering our profession. The second writer, on the other hand, advocates the process of complete decortication of the grain and eradication of the bran, and supports his views from chemical and other sources. Divested, however, of all advertising claptrap, there are probably few other subjects which more clearly demand our attention and our assistance in placing the matter simply before the public, so as to induce them to follow the *juste milieu* between their rival benefactors. There cannot well be much dissent from the fact that in reje ing the outer coatings of the wheat we shut out much nitrogenous matters, phosphates, &c., from our bread, and thus at once abstract nourishment and render it more expensive; but again, if we retain the bran, we have husk, which, especially if coarsely ground, as is the present custom, altogether defies a delicate digestion, and passes through the system unchanged, often producing local irritation. It is, however, held by many authorities that the latter objection is, to some extent, to be got over by a finer system of grinding; while, at the same time, attention should be given to the circumstance that the bran contains the elements of its own easy digestion, in the shape of such bodies as the 'cerealin' of M. Mege Mouries, which is said to possess a wonderful power of altering the starch into dextrin and sugar, and so rendering its assimilation into the organism much more easy. It is certain that many peasantries, like the Scottish Highlanders, who are nourished almost entirely on the meal of extremely nitrogenous cereals, such as oats, are invariably very fine and muscular races. But what can be digested by men in full bodily employment may prove unsuitable for delicate persons of sedentary habits, and it is between cases like these that we must discriminate in advising coarse or refined bread. The great reform which seems necessary to us is that all bakers should be obliged to sell whole-meal bread at a proportionately low price to the amount of bran retained in the grinding. At present the great bulk of bakers sell brown bread as fancy bread, and not only charge as much for it as they do for white, but also fail in giving full 4 lb. loaves. The profits on this transaction must be great, seeing that the price of corn simply ground, and without previous decortication and consequent loss both of material and price of labour, must be much under that of white flour; but yet the fact remains that, to make this profit, Britain is almost the only country where brown bread cannot be everywhere obtained at its proper low price. If the matter of cost were equitably adjusted, we would very soon have the labouring classes using brown bread almost universally, because they would quickly discover that they not only had a cheaper article of diet, but one on which they could do more hard work than they can on white bread, while by their free bodily exercise any little irritation from the husk would be easily overcome. On the other hand, the wealthier classes would adhere generally to their white bread, unless specially advised to the contrary in particular cases, because it is more delicate and pleasant to eat, while the loss of nourishing material can be easily made up from other sources, or by some such means as the addition of minute quantities of phosphates to the flour in the manner suggested by Baron Liebig. What we would suggest, therefore, is that the whole-meal bread should be universally supplied at a fair price, and also prepared from a meal in a finer state of division than that at present employed, so as to reduce as far as possible the husk objection. In this way the real *juste milieu* would be attained, and every class would be supplied with its most natural food.—*Lancet.*

THE

UNTRY GENTLEMAN'S MAGAZINE

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THE IRISH LAND DIFFICULTY.

S several Cabinet Ministers have now declared that the Government Bill :ontain no proposal that will injuriously the interest of landlords, the fears that been so frequently expressed that the vould be of a most revolutionary charac- .nd subversive of landlords' proprietary s, ought now to be entirely allayed.

:ing assured on this important point, it be wished that the settlement of a ques- involving the interests not only of Ire- itself, but of the whole British Empire, l be removed entirely from the domain *rty* politics. For centuries Ireland has the battle-ground of party politics, the ts of which are a standing reproach to the itry in the eyes of the civilised world, viz., contented people, and a perfect hornet's of professional agitators. None of the t parties in the State can lay the whole ie of this at the door of the other—none ltogether blameless. Party-interests and ions have too often projected schemes :h have proved abortive, and frustrated rs which would have done much to ame- .te the present condition of things. How- desirable it may be, we fear the time has yet arrived when a question of such magni- : can be settled without a party conflict. rly all are at one as to the ends in view; means to this end is the problem that iires solution, and which will be made war cry of parties on this occasion also.

If it is desirable to have this question removed from the region of party *politics*, it is infinitely more so that the subject of *religious* parties should not be unnecessarily imported into it. It is neither a Protestant nor a Roman Catholic question, but one in which the future well-being of the Irish nation, as a whole, and indeed the whole British empire, is involved. Any attempt, therefore, to aggravate the difficulty by setting one religious sect against the other is to be deprecated. The question is surrounded with enough difficulties arising in a natural way, without the situation being made more hazardous by the stirring up of religious animosities.

That something is wrong in connexion with the tenure of land, which injuriously affects and disturbs the social state of Ireland, is asserted by all parties; and also that the time has now arrived when some attempt at least should be made to have that wrong righted. Any well devised measure, therefore, that is submitted to Parliament that gives promise of peace and prosperity to Ireland, by placing the tenure of land on a more satisfactory footing, by giving the occupiers an interest in increasing the productiveness of the soil, without invading the landlords' proprietary rights, should be hailed with satisfaction by all parties. When all is done that the Legislature can do to cure Ireland's disorder, it is to be feared that there will long linger recollections of the unhappy past to prevent the future, for a considerable time at least, becoming what it might be. But this is the greater reason why there should now be hearty co-operation both in the parties of the State, and among the landlords and tenants themselves, in finding an effectual remedy for so deep-rooted an evil.

It is to be feared that the root of the disorder in Ireland lies quite as much in the mutual distrust of landlord and tenant as in the nature of the laws affecting land. With the laws as they at present stand, and leases granted on equitable terms, there seems no good reason why there should be any *special* legislation for Ireland. But in the absence of leases, tenants are entirely at the mercy of landlords, without security for the sinking of capital for improvements; and whatever encouragement the former may receive from the latter to lay out their means in improving their holdings, they feel that without something in writing they have no claim upon their landlords for one shilling of outlay. The consequence is an impoverished country, and demoralized people. It is sad to think that in a vast number of cases the landlord may pledge his honour and his word, and repeat his verbal promises with any amount of asseveration; but while his hands are loose, the tenants will not believe him. They receive his assurances with apparent assent, and repay them with promises and protestations of equal value, which are best described by the vulgar term *palaver*. This has gone on until both classes have, in dealing with each other, been demoralized to a lamentable extent.

This is an evil which no legislation in the world can altogether remove; and as it must be evident to both parties that Parliament is resolved, as far as it can, to apply a remedy to Ireland's deep sore, it does seem desirable, that in the interval before Parliament assembles, they should themselves endeavour to heal their differences, in a united attempt to suggest what they consider bes for the future welfare of their country. None know the depth of the disease as they do none are so sharp-witted as they are in knowing, could they but lay aside their class prejudices, what to recommend as a specific cure.

Meetings are being held by the tenants in various parts, where demands are made of a nature far too extravagant to be entertained by any Parliament in this country. While professedly resolving to maintain the rights of the landlord, they pass a series of resolutions which would leave landlords in the position of mere puppets in the hands of their tenants.

We read of calls being made to the landlords to be up and arm themselves against the threatened attack upon their territorial rights; but we do not hear of anything being done by them. They are no doubt well assured that, however threatening the storm may appear, the laws of the land will effectually protect their rights against any violent shock, and that they need not, therefore, bestir themselves. But as these very laws will inevitably undergo revision, prudence seems to dictate that they should take counsel in time, how best to direct the coming movement, or to avert the threatened danger. Had they been wise in time, they might, as English landlords did two hundred years ago when placed in almost similar circumstances, have avoided the necessity of any legislation whatever, by making prudent concessions to their tenants; but as legislation is now determined upon, much good may be done, and the application of the remedy much simplified, by their taking counsel with their tenants, even now, as to what will best meet the present emergency. Failing this, Parliament will of course pass such measures, as in its wisdom it sees best fitted to promote the peace, prosperity, and contentment of the sister isle.

HOW SHALL WE FEED OUR PEOPLE?

IERE are few people, we should suppose, better known to the agricultural than Professor Gamgee. As a lecturer Royal Veterinary College, Edinburgh, nder the supervision of the late Pro- Dick, he was admired for his eloquence is general amiability of temper. All ts who thoroughly knew him concurred belief, that he was a man singularly and one who could impart instruction ay quite different, and more eloquently, most teachers could. When circums led him to start a New College of his e was supported by men well versed in lture; and his career since has only the wealth and the extent of his know-

We are quite well aware that some have disputed his claims, but we are re that they, looking to all the circums, were thoroughly qualified to judge. pinions of some of those who did not gree with him, are certainly entitled to respect; but they appear to have for- that all men are liable to error, hat no great truth can ever be d unless a man is at once speculad bold. All new doctrines or ideas re propounded, require a considerable t of time before they are recognised by neral public. We don't suppose that Sir Newton's theory of gravitation was ac- without much difference of opinion on rt of other philosophers of his day, gh it is now recognised by all as right. George Stephenson first proposed to run ine along a line of rails, he was laughed sneeringly asked, if a cow got upon the hat would be the result? and his answer s questioner to confusion, "So much rse for the coo." The first proposer telegraph was considered "daft," but neral opinion now is, that any business fusing to use the wire is considered a fit t for a lunatic asylum. Many attempts een made to fly through the air with ecision of a ship upon the sea; these ot hitherto been successful, but looking at what science has attained in other fields, it would be rash to say that the thing is impossible.

This is slightly a digression, but we shall now return to the heading of our article, "How shall we feed our people?" That is Professor Gamgee's question. It is becoming a most important one; and we thank the Professor for having endeavoured to solve the problem. This he has attempted to do at a meeting of the Midland Farmers' Club recently held in Birmingham—a club, it may be mentioned, composed for the most part of practical men. He says, and we have the authority of the *Midland Counties' Herald* reporter that his statement is not incorrect, that meat can be preserved so as to appear fresh at a dinner table, no matter from what part of the globe it should come. Meat preserved by the process of Professor Gamgee, formed the staple of the dinner of which the Midland Club partook, and all present pronounced it "excellent," and that "there was no perceptible difference between them [the joints] and ordinary fresh meat." All are aware that in America and Australia, there are a vast number of herds, which, at the present time, bring little more than the price of their hides, and their horns, and tallow: if, by any scientific process, such as that of Professor Gamgee's, the flesh can be brought to this country fresh and good, the boon conferred upon the people of the British Isles will be one of no ordinary value. All householders know that at the present time meat is a very serious item in the daily expenditure, and if it can be cheapened in any way without a deterioration of quality, the best thanks of the public are due to the man who succeeds in doing it. But while we welcome fresh beef from other shores without the slightest chance of disease, let us, at the same time, take every precaution to prevent disease among our home herds; and when it does unfortunately appear, at once take the most stringent measures in our power to "stamp it out."

THE FUTURE OF MEAT SUPPLIES, AND CATTLE TRANSIT BY LAND AND WATER.

BY PROFESSOR GAMGEE.

THE race for life and pre-eminence amongst civilised nations never was so severly contested as at the present time. Social reformers, guided by the light of an ever-increasing experience, and conscious of the readiness with which those, who neglect opportunities, must yield to their betters, are ever seeking to determine which of the great questions presenting themselves, according to our necessities, are the most urgent and the most readily solved. If we look back to the labours of our own Parliament it will be seen how much it is necessary to concentrate public thought, and develop public opinion on one subject at a time. In this particular, masses of people and individuals are very much alike. There is, however, a vast difference between the susceptibility of one and the many. The education of the multitude is a matter of time—of many years—and enlightenment usually follows great calamities, which so rivit the attention to the truth, as spoken first by the few, as to ensure substantial progress. We need not search far for an illustration. We have one in the greatest of the social problems awaiting solution—how shall we feed our people?

That age is long since past when, hemmed in by seas, a sparse population could subsist on the produce of an uncultivated soil. Circumstances conduced with British enterprise to hasten the digging of our coal-fields and the development of our manufactures, whereby we became the most active agents in fostering and advancing civilization. Our people have concentrated themselves in unprecedented numbers around the busy centres of labour, and great intensity of thought and application have developed an artisan class, the most remote in its tastes and instincts from our forefathers, who, living by the chase, could, however, moderately provide for themselves.

It is of the highest moment that we should maintain our pre-eminence in the commercial world—that, however much any single branch of trade may be damaged by greater facilities or resources discovered elsewhere, we should, in the main, keep a-head. We develope muscle and brains at great cost, and it is essential that the trained hands around us should be provided with the abundance of distant lands. We cannot afford to lose them; their efficiency must be maintained. We must, therefore, search for means whereby the comforts they are promised elsewhere can be brought to their very door. Such have been the considerations which have weighed with the advocates of Free Trade.

When Sir Robert Peel and his supporters opened our ports to foreign cattle, which had been excluded in consequence of their disease-bearing tendencies last century, an effort was made in the right direction. Unfortunately, our veterinary colleges had been mismanaged, and the abundant information regarding Continental plagues in animals had not found its wa to this country. The question of disease never onc entered the public mind. Tentative importations ha brought us, prior to 1842, the vesicular murrain, whic our farmers called "the epidemic," and the fat lung complaint came next, which we could only di tinguish as the "new disease." From Germany w learned that these maladies always prevailed on th Continent, and were known as the "maul-und rlaue seuche," "foot-and-mouth plague," and the "lunge seuche," or "lung plague." But no one stood up t advise our Government or our people as to the origi and results of impure importations, which were speedil destroying far more animal food than the most acti trade with accessible countries could provide for u No, even so late as 1864, after some years' labour i attempting to demonstrate the foreign origin epizootics, we were met by Professor Dick, in Edi burgh, who advocated the non-contagious origin these diseases.

Professor Simonds, who spoke and defended the atmospheric origin, whereby they were rendered u controllable; agricultural societies, represented b such men as Mr Hall Maxwell; and the farmer especially of Scotland and Ireland, who rose almo as one man to oppose the course, and the only on whereby several millions worth of animal food mig be saved annually for our people. When for the fi time, in November 1863, I advocated the establis ment of foreign stock markets, attacking the almo useless, and hence pernicious, system of inspection, was denounced as an anti-free-trader, and as one wh would, on the slightest pretence, interfere with th food supplies of this great nation. Efforts, howev persistent, to dispel error and ensure that the trut might prevail, seemed to produce as much impressio as drops of water on the sea level. The rinderpe came at last. Not only did it find us unprepared t act, but unprepared to listen. A mortality of nearly if not quite, 20,000 head of cattle weekly, impressed lesson. There are not a few now who speak on cattl disease with an aplomb and certainty which is quit edifying, and to me, recalling as I can their antie prejudices, in many cases most amusing. The cattl been the popular educator, and I only wish in high places would be rather more dis- ad the people right than to be led.

too much disposition even now for those) think that it is dangerous to anticipate sire. Were it not for this I am sure the f all foreign stock at the ports would have ed long since, and those wide-spread out- foot-and-mouth disease and pleuro-pneu- iich are sapping our resources to a very nt, would not have been witnessed. It is he lung disease never has quite left us. s suffered without intermission, and wher- plague restrictions nearly cleaned it from ies and British farms, so soon as Irish store d freely about England and Scotland, and re thrown open, the insidious plague again . On this point we cannot absolve the Government from blame, inasmuch as the e dissemination of the truth would have adoption of means whereby pleuro-pneu- the British isles would soon be classed c things that were.

ars ago, a Commission was appointed to in- he efficacy of inoculation as a preventive of umonia. Dr Willems, of Hasselt, had, in ted, and soon after proved, that the disease controlled by inoculation; whereas the l Germans, the Italians, Dutch, and others, t out and discovered the benefits to be de- Dr Willem's practice. Professor Simonds ed, reported against the plan, and led us to .

first International Veterinary Congress, in rned how much time we had lost, and have here and in America, striven to draw ntion to a practice which must sooner or lely adopted. It is now admitted on all ad, amongst the most advanced and most ne veterinary profession, that whereas the e can be effectually stamped out, like the it is cheaper, and quite as certain in results, inoculation with isolation, killing the first ected in a herd, and inoculating the rest, a fortnight or three weeks, as a rule, an m may be pronounced clear of disease.

difficult to perceive that the obstacles to an upply of wholesome animal food are of a artly to be overcome at once, and partly to d by the gradual but steady adaptation of gements to altered circumstances. A per- de in meat must be forthwith inaugurated. been as yet, and however paradoxical it we can only secure its benefits by what r on the surface as trade restrictions. It pages of the *Veterinary Review* that I first ed the fact, that the amount of animal food r our people had been diminished by the le. Plagues have so wasted and destroyed f this land that we should have had cheaper and better meat during the past twenty-five years had we never imported Continental stock. I shall not detain you with statistics on the subject. In the pages of the agricultural journals my original statements have met with corroboration, and Mr Algernon Clarke, whom you all know as a sound writer on agricultural subjects, wrote a letter to the *Times* last July, in which he shewed that of the meat consumed in 1867 in the United Kingdom, a fair calculation would reveal that foreign supplies only yielded 2¾ per cent. of the whole, and that an equivalent would be furnished by an increase at home of only 3 per cent.

In 1862, I was fortunate enough to secure statistics which indicated that whereas, prior to 1842, the mortality amongst our cattle never exceeded 1½ to 2½ per cent., since the importation of foreign cattle and contagious diseases it had risen to 5, 6, and even 7 per cent. per annum. During the six years, ending 1860, the loss by disease was four times the number of cattle imported, and by Pleuro-pneumonia alone it exceeded twice that number. I shewed that the losses occurred amongst the best cattle, and that the value of the animals we lost was no less than 5.89, or nearly six times the value of those imported. Couple these facts with Mr Clarke's estimate relating to 1867, and what do we find? that we should have a clear gain of 1 or 2 per cent. on our total meat supplies, if, by the complete exclusion of foreign stock we could, and we undoubtedly should, have prevented the ravages by foreign plagues. It is self-evident, therefore, that free trade in meat involves that impure importations, which disseminate disease in our markets and farm-yards, should cease. It is not a little strange that restrictions in our home trade have found greater favour ever since the rinderpest was imported, than the only rational method whereby fresh accessions of foreign animal poisons could be prevented. The foreign importers are wealthy and combined. The voice of the agricultural community has been stifled by a senseless cry, supported, I am sorry to say, by influential members of the House, to the effect that it was again seeking protection.

The experience of the past four years has shewn that, within the limits of Great Britain, the trade in animals for slaughter can, with great advantage, be turned into a trade in dead meat. Foreign importers have, however, carried the day with assertions to the effect, that unless their cattle enter the metropolitan and other markets with our own, the foreign supplies will cease, or be largely curtailed. Lord Robert Montagu, Mr Forster, and others, have each in their turn been alarmed at the probable consequence of transporting dead meat from the Essex Marshes to Smithfield. All that can be said and shewn respecting the Aberdeen trade fails to produce an impression, and it is owing to this that the country has been visited by a wide-spread, and certainly, from a meat consumer's point of view, ruinous, dissemination of foot-and-mouth disease. It is strange that thirty years' experience should not have taught the more regarding this loathsome complaint. It is the most readily communicable of all epizootics, from the shortness of its period of incubation, and the fact that all warm-blooded animals are liable to it. Human beings are not exempt, and just as young pigs and calves die of it, so may it, in my opinion, prove fatal in infants. Not only do farm-yard animals propagate the disorder, but game, dogs, cats, and even rats, carry it from place to place. You all know what loss is incurred by an outbreak of this malady on a dairy farm or in spring time amongst a flock of lambing ewes. It is asserted that the malady is curable, and people make light of it. Nevertheless, it is easy to demonstrate that since it was first imported we have lost infinitely more by it than by rinderpest. A farmer buying lean stock affected with the disease may imagine that a few days' treatment, resulting in recovery of the whole, little can be lost on this winter's feeding; but this is not the case. Time is still needed to complete the demonstration of a fact on which I have often insisted, that the really vexatious restrictions on trade are those which not only injuriously affect our meat markets, but fail to prevent the introduction and distribution of contagious diseases. Veterinary inspection, essential as it is that we may know where disease prevails with a view to the adoption of preventive measures, is utterly unreliable as applied at ports, and it is absolutely injurious from its effect on importations, and engendering a false sense of security at home. It is to be regretted that the advantages to be derived from a national inspection of markets, and the determination of diseases on farms, &c., are denied us. They are only to be secured by the frequent publication of reports, such as have thrown light on the causes of our human mortality. But although we have had a Veterinary Department of the Privy Council for four years, I am sorry to say we have received no benefit of this description, except in the form of a very meagre numerical table relating to the cattle plague.

It is necessary I should not be misunderstood in relation to port inspection. During the many years that we have suffered most from impure importations, inspection has professedly taken place, both at the port of embarkation and debarkation. Whatever may be said of the work done abroad, that done at home has been fraught with untold mischief. My remarks are not directed to the body of inspectors, but to the system of inspection. We all know what it is to examine a horse for soundness, and there are many skilled veterinarians who almost at a glance will point out glaring defects. They would not rely, however, on any instantaneous process for the inspection of a few hundred recruits for our cavalry stables. Were any respectable man to be asked to give his certificate for even so few as eight or ten horses walked leisurely past him, he would scout the idea, and under the greatest pressure he would certainly give five or ten minutes to the inspection of each animal. All I can say is, that the inspection of cattle at ports has averaged, to my knowledge, from two to twenty pe minute. Often a bullock has been closely* (? inspected hanging in a sling on the ship's side, and always, to my knowledge, without facilitie for a careful manipulation, taking the pulse, temperature, &c., which are absolute essentials i the diagnosis of contagious diseases. I can clai some practical familiarity with the inspectio of herds of cattle. I have stood on a hillock, i Western America, with a body of men, catching wit the lasso such animals as I indicated, and, with quick horse and reliable thermometers, I could pic out infected animals at the rate of one in ten minute That is inspection under great disadvantages; but have often timed myself on a farm, where cattle we tied up or enclosed in yards, and the quickest work could ever do was one animal in three minutes. cannot, I hope, usually be charged with being slow i my movements; and if any one attempts to report o a number of cattle without an examination conducte searchingly, by means requiring the time named, yo may consider the reports not worth the paper o which they are written. I refer to the experience medical men in my support, though, I am sorry to sa that in out-patients' rooms in metropolitan hospital sick people are seen, prescribed for, and even operate upon at the rate of some scores per hour by individu physicians and surgeons. The result has been, of lat an agitation in opposition to such, perhaps unavoidable, but certainly most deplorable treatment.

It was the practice before the Contagious Diseas (Animals) Act came into force to kill the few animal out of a herd or flock shewing signs of foot-and-mout disease, and let the remainder pass. Of course, man of these would shew symptoms before they reached th market, and, thanks to this, cattle have been sufferin over the whole country. Mr Wilkinson, the able inspector of the Port of Newcastle, has recently writte on this point to the papers. Now, the whole infecte herd or flock is slaughtered, and the result is, tha Dutch sheep are being slaughtered at Rotterdam and sent to London in the carcase. I have it, however, on the authority of an eminent meat salesman, t whom animals for slaughter are consigned from abroad, that, of late, foreign animals have been inspected o arrival and then detained—*without subsequent inspection*—for twelve hours. Can we be astonished i foreign importers, and all others acquainted with th manner in which the live stock trade is tampered wit for no good, complain, and sometimes attempt to se the law at defiance?

An important stage in the process by which radical and sufficient measures for the prevention of disease are to be adopted, seems to have been attained in the demonstration of the fact that our Government, with all its treacherous machinery, has failed in securing the desired end—an unrestricted supply of wholesome animal food. And this, gentlemen, leads me to the consideration of the transit of cattle by land and water. The points on which you are asked to give advice are—1st, The supply of food and water to transported animals by sea or railway. 2d, Protection of animals in transit from unnecessary suffering. 3d, Protection of animals from unnecessary suffering after landing from ports in the United Kingdom to ports in Great Britain, and also during their inland transit. We have been told —and indeed we well knew—that whilst our hearts are open to the cries of suffering animals, our pockets are practically closed against any great outlay.

If you listen to Mr Bridges Adams, existing vessels are all too short and too narrow to prevent sea-sickness. Firm foothold is a prime essential to appetite and good digestion on the German or any other ocean, and we want a few vessels, costing half-a-million a-piece, whether they will pay or not, in order to feed live stock, and convey it from abroad without "unnecessary" suffering. I go to the manager of one of our greatest railway lines, and speak of altering the cattle trucks, so that animals may be passed out without blasphemous epithets and the use of bludgeons, and he wisely says, "Admitted the practicability, if we are to open the whole side of a cattle truck it involves an enormous expenditure on the alteration of the rolling stock." "Railway companies are never considered." I have not studied this subject in my library. I have had charge of animals at sea, I have been on vessels trading in the German Ocean, the Mediterranean, and the Gulf of Mexico. I have watched the condition of animals before leaving ports and on landing after ten, twenty, or even a hundred hours at sea, and can only come to the conclusion, that unless Mr Bridges Adams's grand scheme is practicable, they should never be carried at all, or at all events as rarely as possible. It is true that a few bags of bones were landed by the City of Rio, from the River Plate, recently, and journalists hailed the event as full of hope and without precedent; but whilst we have sent may a bull, ram, thoroughbred horse, or other animal to Australia, no one acquainted with ocean transportation can believe that the carrying of animals for slaughter, even on a dozen hours' voyage, is the right thing. Suffer they do, and always must, and to such an extent that so soon as a little more is done in the way of developing the dead meat trade, all "unnecessary," and even avoidable, pain will be prevented by slaughter across the seas. A great deal of suffering can certainly be prevented by rigid attention to the feeding and watering of animals immediately before they are shipped. This is said to be done at Rotterdam and elsewhere, but oftentimes the process simply consists in a man moving from one on to another with a pailful of water, and since cattle have, if possible, less knowledge of the future than human beings, they often neglect the golden opportunity, and shrink with fright from the considerate drover.

In relation to the Irish trade, great good might be accomplished by insisting on animals being detained for a reasonable time before shipment, where they can have an abundance of water and some food. All ruminating animals, if well fed, carry in their paunch enough solid food to last them many hours without injury, especially if water is at hand, so that it is much more important to attend to a supply of water in transit than of food. Indeed, it is found both at sea and in railway trucks, animals travel best if not over distended by an excess of food. A well-nourished ox will waste somewhat, but not suffer any serious pain or inconvenience on a twenty-four or thirty hours' journey if watered, and the best food that could be given to fat cattle accustomed to being fed on meal would be some meal and water. If time to rest and recruit themselves were allowed, both cattle and sheep would travel better on hay than anything else, and this is all that we can expect them to have on board ship. The most prolific source of suffering and deaths on vessels engaged in the cattle traffic is due to bad ventilation. Mr Bridges Adams would doubtless provide for this in his monster steady ships, but meanwhile it may be advisable to ascertain what is really the best kind of craft in which to transport live stock.

Farm Architecture.

THE SANITARY ARRANGEMENT AND CONSTRUCTION OF BUILDINGS, DRAINAGE, AND SEWAGE.

IT is somewhat instructive to look back upon the condition of affairs in this department, existing within the memory of man, not only near the houses, or rather hovels, of the poor, but closely appertaining to the mansions of the rich. Disgusting influences, suggestive of anything but the "balmy gales of Araby the blest," were allowed to accumulate, and to remain from year to year with the most stoical indifference on the part of those subjected to them. If it be true that the habits of a people, with reference to external cleanliness, and their arrangements for removing excrementitious matter from the neighbourhood of their dwelling places, afford a correct indication of their station in civilization, what a low standard our ancestors must have descended to! Alas, that, judged by this rule, so many of our present population should remain at a like depth of degradation! "It is a deplorable proof of the want of information, and of the appreciation of the circumstances on which the improvement of the moral, as well as the physical condition of the population depends, that the existence of filth in houses and towns, the prevalence of filthy habits among the people, and the efforts to remedy or mitigate the attendant evils, are often treated with unconcern, as if the subject was of no consequence, or fitted only to excite disgust; we may here remark, if, indeed, it does even that."

It is now conceded on all hands, that, in addition to the marvellously foul objects presenting themselves daily to notice, where sewage matter is allowed to remain decomposing in the neighbourhood of our dwellings, influences of a potent kind are assuredly engendered which act most prejudicially on health. The air around us, contaminated by the volatile products arising from such masses, passing off as they list, is anything put pure and life giving.

"The presence"—says the Report of the General Board of Health, on "The Sewage and Cleansing of Towns"—"of impurity produced by the decomposition of animal and vegetable matter, is now established as a constant concomitant of the excessive ravages of typhus and other epedimic diseases in towns; and a proportionate exemption from such maladies has marked the removal of the sources of aerial pollution. In proportion as perfect cleanliness has been obtained in prisons, the gaol fever has ceased to exist; and a comparative exemption from the entire class of zymotic diseases has followed the progress of purification in every description of inhabitants." Numerous cases could be cited in proof of this opinion or fact. Take, for instance, two remarkable ones. The last visitation of cholera at Newcastle caused fearful havoc amongst the town people. The military barracks enjoyed a remarkable immunity from the attacks of the pestilence, while it was numbering its victims daily in houses but a stonethrow from the walls; within them no deaths occurred. How was this? While, from conflicting interests, indifference, or ignorance, the disease was allowed to run riot through the town, aided by its congenial filth, the medical officers of the garrison, with all promptitude, carried out vigorous proceedings to lessen the severity of an attack from which they could not hope altogether to escape. The sewers, drains, privies, and ash pits were thoroughly cleansed; all accumulations were thoroughly removed;

the spots where such filth had been collected were purified; the freest possible ventilation was established, day and night, in living and sleeping rooms—over-crowding was guarded against. By these and other means, as regulation of diet, &c., no case of cholera occurred within the barracks during the whole period of the epidemic, and every case of diarrhœa was stopped from passing on to the developed stage of the disease; while in Newcastle there were upwards of 4000 attacks and 1543 deaths. But the connexion between cause and effect is still more strikingly shewn in the case mentioned by Dr Southwood Smith, the able sanitary philosopher, in a pamphlet, "The Results of Sanitary Improvement." During the prevalence of cholera in America, in 1849, the city of Baltimore was saved from an attack by the energetic measures taken to purify and cleanse the town; so effectually was this done, that never before had the city been so clean, or so thoroughly purified. Two miles from the city, in a neighbourhood remarkable for its beauty and salubrity, stands the workhouse; the same means were taken to have the establishment in a state of perfect cleanliness, as had ensured the city from the disease, but without the same result. On the 1st of July the cholera attacked an inmate; on the 7th, another attack occurred; within a month the disease had numbered its ninety-nine victims. Every effort was made to discover the cause of this singular exception to a general rule, but without success, until behind the house a vast mass of filth was found in a ravine outside the northern wall; the "whole space included between the ravine and the wall, upon its north side, was one putrid and pestilential mass, capable of generating, under the ardent rays of a midsummer sun, the most poisonous and deadly exhalations." During the whole time nearly in which the epidemic continued, the wind had been blowing gently from the north, passing over this teaming mass of filth, and conveying the poisonous exhalation directly to the house. Those first attacked were lodged in that part of the house open to this deadly breeze. In the basement of this part of the building seventeen lunatics were lodged; all were attacked and all died. In the rooms not exposed to this breeze, that is, those with a southern exposure, no attacks occurred. After some delay, the mass of filth was removed from the ravine, it was thoroughly drained and cleansed by a stream of water, covered with a layer of lime, and finally with earth. The day previous to the completion of this work eleven deaths had occurred; the day after, three; and in a short time the disease had completely disappeared.

It is scarcely necessary to enter much further into the details of the connexion between defective sewerage and the propagation of disease. It is now universally admitted, that the exhalations arising from the decaying putridity of deficiently arranged and constructed drains, and, what is worse, the open cesspool, are strongly inducive of disease. Indeed, as an able authority expresses it, "the immediate and direct cause of fever" may be said to be the poison generated by the decomposition of animal and vegetable matters. The experience of every medical man goes to prove that a badly cleansed and drained district is always a fever one. A competent witness remarks, that "in addition to a general disarrangement of health, and an unusual liability to disease, there is one particular class of disease which is always to be found in neglected places—I mean the class of contagious disorders. History teaches us that pestilence has always haunted the scenes of filth. The plague, the black death, the cholera, the camp, gaol, and ship fevers, all have made these scenes their favourite resorts; and typhus fever, our modern pestilence, forms no exception to the rule."

CHEAP COTTAGES.

IT appears that Mr Edwin Chadwick, C.B., whilst engaged in the discharge of his duties as a juror at the Paris Exhibition of 1867, formed so favourable an opinion of a method of constructing cottages invented by Mr Nicoll, of No. 42 Regent Circus, London, and exhibited at the Paris Exhibition, as to bring it under the notice of the commissioners engaged in the inquiry which is now being made into the employment of women and children in agriculture. These gentlemen at once made the most accurate inquiries in their power upon the subject of Mr Nicoll's invention, from gentlemen practically conversant with the requirements of cottage-building, and with most encouraging results.

Mr Nicoll's cottages are erected of slabs of concrete, and the mode of construction of these slabs may be described briefly as follows:—A slab is formed of a size varying with the purposes for which it is to be used in the building, but commonly nine feet by three feet, and three inches thick. The slab is composed of several layers, which together form the thickness of three inches. The centre consists of a fabric of straw sewn together by a large sewing machine, and compressed at the same time by rollers to one inch in thickness. It is steeped in a silicate, to render it incombustible, and then set in a frame of one-inch angle-iron, strengthened by cross-bars of iron, which go through it at intervals of eight or twelve inches, and which are welded to the iron frame. A coating of small gravel by Syssell asphalt is laid on each surface of the straw, a quarter of an inch thick, small spaces being left clear at intervals (but afterwards covered up), to admit of nut-screws being inserted to screw the slabs together when put into their place in the building. When so fixed in the building—the lower edge having been first firmly embedded in a foundation of concrete, made with the best Portland cement, in the proportion of one of cement to six of broken stone, or any other hard material; and then an internal coating of the same is added half an inch thick. There is thus formed a fabric three inches thick, which has as great strength as nine-inch bonded brick-work. Although only three inches thick, the interior layer of straw so obstructs the conduction of heat, that such a wall has been found by experience—as it might of course be expected in theory to be—both warmer in winter and cooler in summer than nine-inch brick-work. The very hard and durable nature of the best Portland cement, concrete, if properly mixed, causes such a wall to resist successfully frost and damp. It is also quite impervious to vermin. The upright angle-irons at the corners, and those across the line of the floor and roof, are made of somewhat larger dimensions for a cottage with an upper floor, than when all the rooms are on the ground floor. As, however, in either case the iron frames of the slabs are all screwed to each other and to the uprights, a structure of immense strength is produced. The slabs forming the roof need only to have an external coating of concrete half an inch thick; the internal coating of concrete is dispensed with, the layer of fine gravel, or powdered stone and asphalt, being sufficient; and as it is capable of receiving a wash of any colour, it becomes a ceiling.

In order to make the cost of construction of his cottages as low as possible, Mr Nicoll has adopted several contrivances, by which he materially reduces the amount of joiner's and glazier's work. By an application also of the forms of flue perfected by Mr Douglas Galton, C.B., and General Morin, he secures a very satisfactory mode of economising fuel, at the same time providing increased warmth and ventilation, together with a hot-air closet for drying clothes. The value of a dry-air closet of this kind, which enables a labourer to dry his working-clothes thoroughly, and so to ward off rheumatism and its attendant evils, is very great. It is gratifying to learn that upon Mr Nicoll's plan, which we have just described, a cottage with a living-room and three bedrooms of ample size, and fulfilling all the requirements of health, decency, and comfort, can be built for £85. Such a cottage being of great strength, and proof against both fire and damp, no appreciable sum need be calculated upon as necessary for repairs. A rent, therefore, of one shilling and sixpence a week, or £3, 18s. a year, would pay within a fraction of five per cent. per annum—which, upon the assumption that the building is found to be as durable as alleged, may fairly be considered a full return for the capital of £85 invested in its erection.

Cottages having but one bedroom, and others having two bedrooms only, are often wanted upon an estate, for the use of the aged, or for couples having no children, in certain proportions to cottages having three bedrooms. Such cottages can be erected upon Mr Nicoll's plan—the cost of the first being £50, and of the second £65; upon which the rent of one shilling, and one shilling and threepence a week respectively, would pay an interest of five per cent.—*Chambers's Journal.*

DIFFERENCE BETWEEN SEWERS AND DRAINS.

MR BAILEY DENTON, the eminent engineer, in a letter to the *Times*, draws the following interesting distinction between sewers and drains:—"A sewer is intended simply to discharge the refuse of towns or habited places direct to the outfall as quickly as possible, without receiving any increase of fluid from the soil through which it passes, or allowing its contents to escape and permeate the soil, the only accession of matter being that of sewage itself conducted into it by branch channels equally impermeable. 'Sewer,' in fact, is a corruption of the word 'issue' or 'issuer.' A drain, on the contrary, is intended to draw out of the land through which it passes the wetness that is in it and to exhaust that wetness as far as capillary attraction and natural retentiveness will permit. The original word—drchnigean—is Saxon; its meaning is to filter and draw out by degrees—the reverse of the object of sewers; and as a drain is intended only to extract liquid, while a sewer is intended to discharge excretal matter, as well as the water containing it, it will be readily understood why every means of excluding subsoil water from the sewer and of admitting it only into the drain should be rigidly carried out. The growing, still growing, use of water for many purposes in the dwelling demands a close recognition of the principle involved in the difference of these two objects, for the more abundantly water is used in a town and flows down the sewers, the more completely will any escaping sewage matter it holds in solution penetrate far and wide into the soil in the neighbourhood of sewers, to rise with retained moisture by capillary attraction to the surface. It is thus the earth becomes 'excrement-sodden;' it is thus the air becomes 'excrement-reeking.' Most subtle is the influence of the atmosphere upon the soil, even many feet below the surface, and perhaps there is not any subject less comprehended than the power of capillary attraction and the influence of the atmosphere upon underground wetness. During the very dry summer of 1868, under-drains 4 feet and 5 feet deep in the ground were observed to discharge water after long cessation, and to cease again after a short period of discharge, and with no other explanation than that indicated by a falling barometer. This phenomenon will satisfy the most sceptical that sewage matter will rise with water to be evolved at the surface. It is impossible, therefore, to over-estimate the evil arising from the passage of sewage out of the sewer into the ground through which it passes, and I have no doubt that many diseases in sewered towns become localized from this cause under circumstances such as I have indicated. It is perfectly useless now to suppose that the people of this country, having known the blessings of water supply, will think of abstaining from a copious use of water; on the contrary, we may look forward to a daily increase of demand, and it matters not whether the earth-closet system of excretal sewerage gains ground in places where advantageous conditions may suggest its adoption, sewers must exist in every place where habitations are congregated together, whether it be a city or a village, for the discharge of liquid refuse from the chamber, the bath, and the kitchen, independently of the excrements of the closet, which form in reality but a small proportion of the entire refuse of the dwelling. At this moment much confusion exists on this head. By many it is thought that by the adoption of earth-closets the necessity of sewers will be done away with. This is not the case, and, considering the small proportion which solid excrements form of the whole refuse, it will be conceded that if sewers are not made water-tight, it is very possible that escaping sewage may taint the soil even in a worse degree than attended the existence of privies and cesspools. The immense importance of a right understanding of these practical points will be acknowledged when it is remembered that there are hundreds of towns and villages in a doubtful state, owing to the contradictory information which exists, waiting for positive data to commence sanitary operations."

Farm Implements.

BRIEF NOTES ON FARM IMPLEMENTS AND MACHINES.

THE GRUBBER.

THE Grubber is the next implement in importance to the plough. Some authorities maintain that this implement had its origin in the harrow, others in the Celtic plough. On the supposition that it originated in the harrow, we can easily conceive how its use was prompted by the desire, as cultivation increased, to free the land from the weeds which, in too many places, infested it. The harrow, while acting upon the clods of the upper surface, tending to break them up and to extract therefrom and gather together the weeds, does not penetrate the soil to any depth, and this, from the form and position of the teeth, which are set perpendicular to the frame in which they are fixed, and at right angles to the line of draught. In certain soils and districts it was discovered that the harrow worked best when the teeth were set with a slight inclination backward, that is, with the point nearer the horses than the upper end. An extension of this idea, so as to give the teeth a considerable angle or set, and the front part of them sharpened, pointed, or chisel-shaped, would shew that a penetrating effect in the soil would be obtained, raising it and the weeds with which it was encumbered. Dragged forward, tines of this shape have a tendency to work, and be buried gradually in the soil; to prevent which action being carried out to too great a degree, it would be deemed advisable to have them attached to frame work running on wheels. The next point which experience would point out, would be the necessity for some means to raise the tines out of the land wholly when not in work, and to regulate their depth as required when in work; this being done by an apparatus, more or less simple, acting upon the frame carrying the tines. Space does not permit of our tracing historically the successive forms of the implement thus shadowed out, but it may be worth while to note, in proof of the supposition that the grubber did take its origin from the heavy or brake harrow, that, in the original form of the grubber when first introduced as a special implement, the tines were set in the frame perpendicularly, precisely like those of the harrow, the points of the tines being taken off at right angles to the length. Wheels were attached to the framing in front, and all the adjustment attainable was secured by simply raising or lowering the stems of these in their sockets. The next improvement consisted in setting the tines to an independent frame, placed in the interior of an external frame, this latter being supported on four wheels, two at the front, and two at the back, while the inner frame, carrying the tines, was raised or lowered by a system of levers, independently of the outer framing. It was not, however, till the year 1820 that an efficient grubber was brought out, this being done by Mr James Finlayson, a Scotch farmer. The principal feature in Finlayson's implement was the form of the tines, which, being curved in their outline, in the way we shall presently notice, enabled the weeds to pass off easily; from this circumstance the implement was long and favourably known as the self-cleansing harrow or grubber. The principle of having curved tines has been adopted in all succeeding implements of this class.

Let us now glance at a few of the points determining the efficiency of this important implement. Grubbers or cultivators may be divided into two classes—first, those in which pth to which the tines work is re- l by means of special mechanical ar- ents, of which Coleman's, or Clay's, kwood's, may be taken as an example; econd, those in which the working is ed simply by means of the framework -after the manner of a swing plough— which Tennant & Smith's (of Bletch- rubbers may be taken as examples. asily conceiveable why one is preferred ne districts to the other, as the soil may be in such a condition that im- ntal working is more desiderated than ne working, or the converse, directing r skill, as we have elsewhere stated, being required in a crude, unequal soil, than it is of uniform character. The principal to be considered in the construction rubber we now attempt to place before ader. And first, as to the form of the nd the angle curve or set in which it is l in the carrying framework. The mere of the tine is of great importance. If or rectangular, the tendency, when d forcibly through the soil, is to push it a mass of soil of the same breadth, s this gets consolidated, an immense nce is given to its passage. We have o exaggerate the breadth of the tine of rm, and conceive of it extending, or of ber of them so closely placed together extend across the whole breadth of the ne, when a resisting surface would be ed to the draught incapable of being me. But in place of having the flat f the square tine to the soil, place it nally, and it will penetrate and pass h the soil with ease, the soil leaving its g sides as the water leaves or passes the bow of a ship. Taking, indeed, notion from this, some makers have pro- . a form of tine shaped somewhat like ow, so as to give the sides of the tine s, the point being bluff in place of sharp, front may have a double curve. The , or set of the tine, is also of immense tance. We can conceive of it having a set that a very large proportion of it be carried forward horizontally, thus increasing the friction on the soil, bringing about in a degree less marked, but in kind the same, the evil which the sole of the plough produces, and further, by opposing resistance to the lifting up of the tines out of the soil.

Having considered the various modes of setting the tines, we draw the conclusion, that they should not be so gradual as to give too much horizontal or level position to the termination or lower part of the tine, but yet sufficient to give it a tendency to work itself and penetrate into the soil. The probability is, that the soil in which it is to work will exercise an important influence upon the form or set of the tine. The set of the upper portion of the tine is also of importance, as on it depends the ease with which it clears itself of weeds and rubbish. There are some forms of tines which will not clear themselves so well of weeds as others, as they will have a tendency to collect and crush themselves up in the bend and corner, whereas they should pass over curved surfaces which have no catching or returning points. The way in which the tines are fixed to the frame exercises also an influence upon the way they are capable of clearing themselves of weeds. In Tennant's grubber the tines are so fixed that their upper terminations are above the frame. The arrangement of the teeth in the frame is also a matter of great importance, for, unless properly placed, one will interfere with another, and if placed too near each other they will choke up with weeds. As regards the distance between the tines, we think 6 inches—a distance often adopted—by far too little; 10 inches we would place as the minimum, going up to 14 inches in very foul land. A good point in Tennant's grubber is the mode by which the tines are fixed to the beam or frame by pinching screws, so that the distance between the tines is capable of being regulated. The height at which the frame bearing the tines is from the ground is also of importance. When supported on wheels of too small a diameter, as 10 to 12 inches, the frame is so near the ground that the weeds rapidly accumulate about it. The wheels should be of such a diameter as to raise the frame quite out of the reach of the weeds, say from 2 feet 4 inches to 3 feet. The temptation to keep the frame low is great; it ensures steadiness, and the minimum of strength and weight in the tines and the frame. In grubbers where the tines are lifted out of the earth by means of mechanism, the great point to be aimed at is avoiding, as much as possible, a perpendicular lift. When the tines are working deeply in the soil, it takes a great force to lift them up. But if the regulating movement is such as that the tines are moved either in the forward or backward direction, they are lifted much more easily. The correct way is to give them a forward or progressive motion, combined with a perpendicular lift.

In the application of the grubber to the cultivation of the soil, as a substitute for the plough, no one probably has had so much experience as Mr Smith, of Woolston, near Bletchley, and to the perfecting of its form he has paid much attention. In his grubber for general purposes, there is a double adjustment for the depth of the tines; the first adjustment is obtained by the stems of the wheels; the second, by fixing the tines in their sloats by wedges. When adjusted to take a depth of 6 or 8 inches, the points of the tines become embedded in the soil, having a remarkably strong tendency to enter it, and a large mass, nearly a yard wide, is torn up, more or less mingled together, and, with the weeds, brought to the surface. Mr Smith's farm affords a splendid example of what can be done by the grubber, aided, as it is, by steam. On a careful consideration, then, of the grubbing or smashing-up system of tillage, many authorities are now strongly inclined to think that it is to an extension of the principle, aided by the power of steam, that we are to look for producing an increase to the productive capabilities of our soils. They confess to seeing in the system a philosophical fitness that they have long been looking for; they see by it all the complicated processes involved in what is termed ploughing, set aside, and operations of extreme simplicity substituted; and, above all, if pulverization of the soil is the thing we really require, they believe it gives us a power to break up the soil at such a time that we can place it under the influences of frost, &c., for the longest possible period; and these atmospheric influences are, as we know, the most important pulverisers of the soil. It certainly seems to us reasonable to expect a more thorough action of these pulverizing influences when we place the material upon which they are to act in the best possible way to enable it to receive them. This is what the grubber does; this is what a plough, perfect according to the usual standard of operation, does not do. Further, the system enables us to keep, as the upper working soil in spring, that which was broken up in the autumn, and exposed all the winter; it enables us, by the handy readiness of its only implement, to work this soil most expeditiously, so that we can take it in hand when in the best condition. On all these points we have enlarged, in special articles on cultivation, to which we refer; and some not yet touched upon will be taken up in articles yet to appear. We repeat, therefore, that there seems good reason for some authorities to come to the conclusion, that there is a philosophical fitness in the "grubber" system for our necessities of cultivation, which they believe they cannot see so well developed in any other system they are acquainted with.

Our Pasture Grasses.

*LOLIUM ITALICUM** (A. Braun).—ITALIAN RYE-GRASS.

ONYMS.—*Lolium Bouchianum*, of Koch and some other Continental authors. *L. multiflorum* and *L. perenne aristatum*, of Babbington. *L. perenne italicum*, of Parnell. French, Ivraie d'Italie.

DESCRIPTION.

) OOTS fibrous, plant usually of two or three years' duration, erect in growth, composed of both fertile and barren ns; the former four or five jointed, and n 2 to 4 feet in height, the latter short, and efly composed of leaf sheaths. Leaves all ad, long, softish, or flaccid, upright in habit, te pointed, smooth on the outer and ghish on the inner surface. Inflorescens in open, erect spikes, each from 4 to 8 inches g, and bearing from twelve to twenty or e spikelets, which are placed edgeways close to the wavy, grooved, roughish, led rachis or centre stem, each having r one flattish fine ribbed outer chaff scale lume (except the terminal one, which has), and usually from seven to fifteen ts or seeds, the lowest of which cely extends beyond the point of the ne. Florets, of two nearly equal sized æ or chaff scales, that become adve on the ripened seed, and the outer hich is furnished with an awn protruding a little below its membraneous summit; awns on the lower being proportionately ter than those on the upper florets. mences to flower about the middle of , and continues throughout the summer autumn months, ripening seeds in from e to four weeks afterwards, according to temperature of the weather.

ompared with the common rye-grass, the an is more close and upright in growth, ss spreading on the surface of the ground, considerably taller, broader foliaged, springs up much more rapidly on being cut or eaten down, and, consequently, it yields a considerably larger bulk of crop in course of the year. But it is most readily distinguished by having an awn of more or less length on each of its florets or seeds. As botanists, however, hold that the presence or absence of awns does not form a good botanical distinction between species of grasses, some of them have treated L. italicum as being merely a variety of L. perenne. This, however, is looked upon by the generality of cultivators as a scientific crotchet. And as in many grasses the presence of awns is admitted to be not only a specific, but a generic characteristic; and seeing that, under cultivation, very little, if any, appearance of intermixture by hybridization takes place between L. perenne and L. italicum, or their varieties, we deem it best to look upon them as constituting distinct species.

NATURAL DISTRIBUTION.

The name is generally looked upon as implying that the natural distribution of this species is restricted to Italy alone; this is, however, a mistake, as it has been found undoubtedly wild in other parts of Southern Europe, as well as in Northern Africa, Palestine, and Armenia; so that it may be considered as indigenous to all, or at least to most of those countries which border upon the Mediterranean Sea, and may even extend further eastward into Central Asia than has yet been ascertained. Its naturalization, however, may now be deemed almost co-extensive with grass cultivation; for although half a century has not yet elapsed since it was first

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rom *Lolium*, a name applied by the Latins to the nous Darnel, L. temulentum; and *italicum*, from species having been first cultivated in Italy.

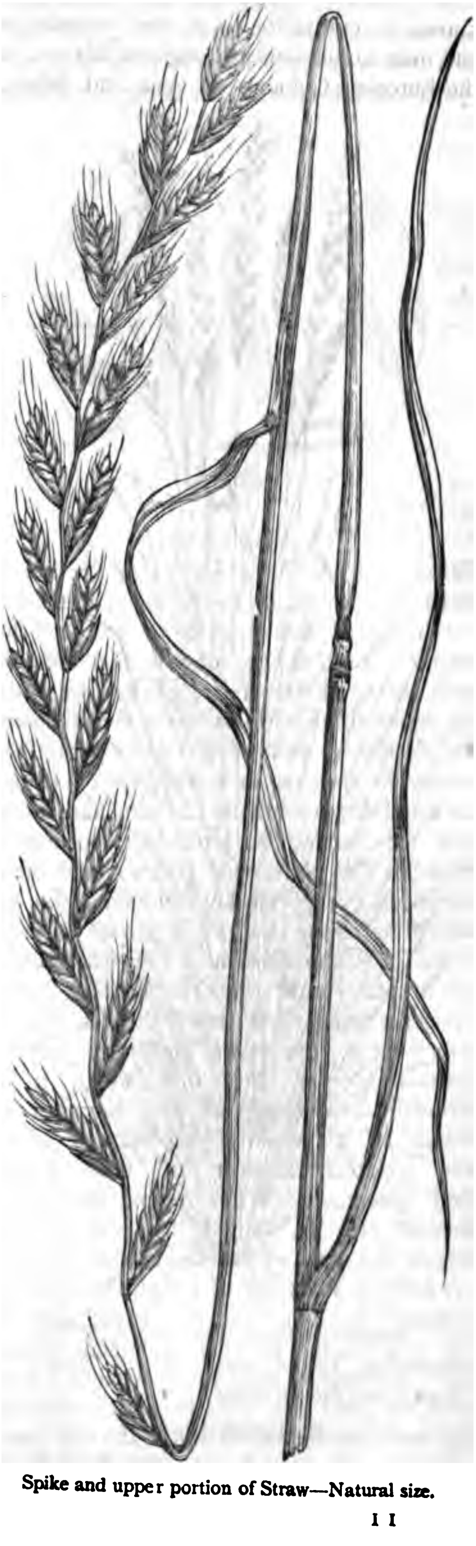
known in cultivation, it is now common in and near arable lands throughout Europe, in the European Colonies of Asia and Africa, Australia, New Zealand, &c., as well as in North and South America.

Reduced sketch, shewing habit of Growth.

CULTURAL HISTORY.

Although, as before shewn, Italy is not exclusively the native country of the Italian rye-grass, yet it is admitted to have been first cultivated there, and to have been introduced from thence through Germany into Britain. In 1831, the late Mr Alexander Thomson, of Banchory, near Aberdeen, communicated a sample of its seeds to Mr Charles Lawson, then the sole, and now the senior partner of the well-known firm of Messrs Peter Lawson & Son. These seeds Mr Thomson obtained at an agricultural exhibition in Munich, or Munchen, the capital of Bavaria; and the same year Mr C. Lawson made his first importation of Italian rye-grass seeds from Hamburg, the quantity being 160 bushels, and the retail selling price 42s. per bushel. The next year he imported 320 bushels, the retail price of which was 35s. In 1836 his imports had increased to 1000 bushels, and the selling price fell to 15s. From this period till 1840, when his imports had increased to 5000 bushels, and the price had fallen to 10s. 6d., these supplies continued to be chiefly procured through Hamburg. But feeling satisfied that the home cultivation of Italian rye-grass was destined to increase rapidly, and that a prejudice then existed in favour of foreign grown seed, Mr Lawson sought out, and made arrangements with, its producers in the province of Lodi, Parma, and neighbouring districts of Northern Italy, which have long been famed for their pastoral, and especially for their dairy products; and in 1841, he shipped 6000 bushels from Leghorn direct. These importations went on annually increasing, till, in 1850, they had reached to 25,000 bushels, the advertised selling price of which was 7s. 6d. This may be looked upon as the culminating period in the importation of foreign Italian rye-grass seed; the British supplies of which were till then almost exclusively derived through the fore-mentioned firm. The prejudices in favour of foreign seed began shortly before this to give way; and a re-action in favour of home grown now rapidly set in, till in the seed market foreign supplies became almost entirely superseded by the products of home cultivation, which were found to be both heavier and cleaner than those obtained from abroad.

the earlier stages of Italian rye-grass cul- on, many formed the erroneous opinion ts broader foliage and stronger growth, mpared with the common rye-grass, were ymous with greater coarseness, as well eriority in feeding qualities; and not a vere at first deterred from cultivating it, se they could not obtain the same price s hay as for that of the other. When n to admit the fallacy of these opinions, e evidence of its being preferred in all ates by cattle, sheep, and hares, many l the further objection, that because it a more rank, as well as more rapidly ssive grower than the other, it must be soil-impoverishing, and, consequently, l to the after crops. None of these tions are longer allowed to influence ators, and many who entertained them gly at the first have now discarded the on rye-grass entirely, and substituted talian for it in the grass rotations of ate husbandry. In addition to its other ent properties, the paramount suitability lian rye-grass for successful culture in y different climates, soils, and exposures, lways entitle it to a first place among ge and forage plants. For it thrives too cold for wheat cultivation, luxuri- hroughout the temperate regions, grows in sub-tropical countries, and maintains dure beyond most other grasses under orching droughts of the central tropics. would not envy the spirited mercantile lucer of it to Britain, at being spared its universal cultivation there, and its l from thence to all parts of the globe the practice of agriculture prevails?



Spike and upper portion of Straw—Natural size.

QUALITIES AND USES.

ommon with the Lolium perenne, the licum possesses the qualities of—1st, t braird and rapid growth of its young , and that in a superlative sense; 2d, l adaptation to all kinds and qualities tivated soils, to which may be added lity for a much wider range of climates; attaining to full maturity in the second f its existence, and even earlier when vithout a corn crop; 4th, Its hardiness, early growth in spring, and long retention of autumn verdure, in which three properties the Italian rye-grass is superior, as also in its much quicker growth after being cut or eaten down; 5th, In its abundant production of seeds, and the facility with which these can be harvested and dressed, or prepared for market; and 6th, Its sub-perennial duration and strictly fibrous-rooted growth, by which its entire destruction is easily accomplished in ploughing, and otherwise preparing the ground for the next succeeding crop. Hence its suitability not only for alternate husbandry, but for forming a prominent portion of mixtures for permanent pastures and other purposes, except fine lawn or short grass, for which its strong and rapid growth entirely unfits it. The close and somewhat tufted habit which characterises the plants of Italian rye-grass makes room for and shelters, without overshading, the more prostrate growing grasses, clovers, &c., with which it is generally associated, so that mixtures in which it is properly proportioned afford the greatest amount of both forage and pasturage. When sown, as is the general practice, along with a corn crop, it largely surpasses all varieties of the common rye-grass in the yield of autumn or stubble foggage; but, like these, it does not attain to full size till the following summer. When sown, however, in early spring without a corn crop, on good rich soils, even two crops of ripe seed may be reaped from it the first year, or it will yield a weight of cattle food either in forage or pasturage fully equal to a full season's growth of common rye-grass and clovers. Being much less soil-exhausting than ripened corn, it is vastly superior to it as a nurse for the young plants of those strictly perennial grasses, clovers, and other plants which should be sown in all permanent grass mixtures; and although liberally introduced into those at first, its short duration makes way in due time for the development of these slower growers. For purposes of irrigation, and especially when that is performed with sewerage water, Italian rye-grass stands pre-eminent; and no other grass has been found to yield the same weight of green food for cattle soiling purposes when repeatedly highly fertilized, especially with liquid manures, and frequently cut. So treated, instances are on record of its yielding in the average climate of Britain six or seven crops in one season, the cumulative length of which exceeded sixteen feet.

Seed magnified.

SEEDS AND CULTIVATION.

The seeds of Italian rye-grass are all less or more awned; the length of awns varying in those different plants and according to the position occupied by them in the spikes and spikelets, the uppermost seeds in each having usually the longest; but the average length of awn may be stated at two-thirds that of the seed. Its seeds are remarkably easy shaken out or beaten off the straw even before they are nearly ripe; hence great care is requisite in harvesting them, firstly, by cutting the crop before they are fully matured; and secondly, in handling the same carefully, both in the processes of drying and ingathering. This slight immaturity in the seeds, and their being prevented by the awns from lying close together in the measure, renders them so light that 15 lb. or 16 lb. per bushel is looked upon as an average weight for foreign seeds; while those of home-growth are frequently from 3 lb. to 4 lb. heavier, arising in part from the latter being better cleaned, and also in some measure from their filling better in the comparatively cool and humid climate of Britain than in that of Italy. One ounce contains about 24,000 seeds, of which the greatest number braird when covered with not more than a ¼-inch of earth, about half as many when the covering is from 1 to 1¼ inch, and none come up when covered 3¼ inches, so that somewhat more care should be taken to prevent over-covering of the seed than with that of common rye-grass, by using light grass-seed harrows, or only rolling them in. When sown alone, 35 lb. to 40 lb. of seed may be allowed to the imperial acre, and 25 lb. to 30 lb. when the usual quantity of clover seeds is added; 12 lb. to 15 lb. with these, and a like weight of common rye-grass; while in mixtures for permanent pasture, 8 lb. to 10 lb. will generally suffice.

CHEMICAL ANALYSIS.

According to Professor Way's experiments, Italian rye-grass collected when in flower, on the 13th of June 1849, in the vicinity of Cirencester, contained, in its green or fresh state—water, 75.61; albuminous or flesh-forming principle, 2.45; fatty matter, 80; respiratory principles, starch, gum, and sugar, 14.11; woody fibre, 4.82; and mineral matter or ash, 2.21. While in a dried state its products were as follows:—Albuminous or flesh-forming principle, 10.10; fatty matter, 3.27; respiratory principles, 57.82; woody fibre, 19.76; and mineral matter or ash, 9.05. Thus shewing a great increase over common rye-grass in the respiratory principles, starch, gum, and sugar; and a no ess marked decrease in woody fibre.

VARIETIES.

The most casual observers can scarcely fail to notice the remarkable diversity in height, form, and other characteristics which the plants in a field of Italian rye-grass present; and it says little for the enterprise of our agricultural plant improvers that they have not done much more in selecting the best of these for cultivation, as by thus procuring permanent reproducing stocks, of the tallest and most leafy varieties, to seed from, considerable increase in bulk of crop would not only be obtained, but the other desirable properties might also be greatly enhanced. And growers who would thus take the trouble of improving their home supplies, could not fail to reap the further benefits of obtaining higher prices and increased demands for thei seeds.

1. *Lolium italicum*, in its normal or ur selected state, possesses the distinguishin characteristics and differences before detailec and may be designated the common Italia rye-grass.

2. *Bailly's Short-awned Annual Rye-gras* (L. multiflorum submuticum of the "Bo Jardinier.")—This is one of three strictl annual kinds (see also Nos. 4 and 7) whic botanists generally look upon as being onl varieties of L. italicum, from which, in add tion to being strictly annual, and havin much heavier seeds, this further differs i some of these being awnless, while th greater number are very shortly awned, th former, when growing, being situated ne the base, and the latter on the upper po tions of the spikelets. It was first cultivate in 1834 or 1835 by M. Bailly, a celebrate French agriculturist in the department of th Loire, who reported having reapep as muc as 6000 lb. of its seeds from an acre. Thes weigh from 36 lb. to 40 lb. per bushel, fro which circumstance, taken in connexion wit its annual duration, it might be suppose that it belonged more properly to th poisonous-seeded darnels, L. temulentum an its allies, from which, however, its growt and other characteristics sufficiently disti guish it. It is of a strong coarseish habi somewhat shorter than that of the Italia rye-grass, and was, as well as No. 4, intr duced to Britain by Messrs Peter Lawson Son, of Edinburgh, in 1837, who discontinue the cultivation of both on finding that the were as strictly annual as any of our cere grains, producing, like them, no aftermat and that they did not surpass the Italian ry grass in either bulk or quality of grass an hay. If, however, the amount of M. Bailly crop of seeds, which was about 20 qrs. p acre, could be raised in Britain, and, mo especially, if these should be found healt and nutritious for domestic animals, its cul vation might prove highly advantageou particularly for autumn sowing, in those fiel where the grass may have either partial or wholly failed.

3. *Branched or Panicled Italian Rye-grass* (L. italicum ramosum).—This differs from all the others in having branched or panicle-like spikes, and may occasionally be seen in Italian rye-grass fields, differing less or more in the number and extent of the branches, as well as in their density, and the habits of the plants. Some of these branched forms yield much more seed than the simple spiked ones, but none of them have yet been found capable of being undeviatingly reproduced from seed.

4. *Brittany many-flowered Annual Rye-grass.*—This differs little in its general appearance from the common Italian rye-grass, but, like No. 2, it is strictly annual, although easily distinguished from it by its longer and finer grass as well as lighter and more awned seeds. It was discovered in the province of Brittany in 1835, by M. Ricffel, Director of the Agricultural Establishment of Grand Jouan, who found, that on high, wet, moorish lands of considerable tenacity, such as do not retain the young clover plants throughout winter, it yielded enormous crops of hay when sown in September, at the rate of 40 lb. to the acre. It was introduced to Britain along with No. 2; but, for like reasons, its cultivation was not persevered in, although it might also be used for thickening up blanks in young grass fields, if sown as soon as the corn crops are cleared off in autumn.

5. *Compact-headed Italian Rye-grass* (L. italicum compositum).—This embraces a considerable number of sub-varieties, differing in the relative length, breadth, and density of their spikes; but, in general, they are dwarfer than the more open spiked sorts, and therefore undeserving of special culture.

6. *Dickinson's Italian Rye-grass* comprehends a number of tallish-growing sub-varieties, which are seemingly the offspring of strong-growing plants promiscuously selected, and not of any particular or special plant.

7. *Many-flowered Annual Rye-grass* (L. multiflorum vera).—This is scarcely distinguishable from the next, except by being strictly annual, like Nos. 2 and 4, which are supposed to have been derived from it. To both of these it is inferior in bulk of produce, and consequently has not been introduced to cultivation; but being also a native of Southern Europe, it is occasionally to be met with among Italian rye-grass.

8. *Many-flowered Italian Rye-grass* (L. italicum multiflorum).—This is one of the forms of Italian rye-grass which deserves more attention from cultivators, as it is not only more productive of seeds than any other—nineteen or even more being often contained in each spikelet—but it is also generally longer in straw, and capable of yielding a more bulky crop.

9. *Short-awned Italian Rye-grass* (L. italicum submuticum).—This differs from No. 2, in being of sub-perennial instead of annual duration; and, also, in generally having shorter and fewer-seeded spikelets, in which each seed is shortly awned. Some look upon this as being a hybrid between L. perenne and L. italicum; but although the appearance of the seeds would seem to justify this notion, the habit of growth is essentially that of the latter. It is by no means unfrequent in fields; but in selecting the best varieties for cultivation, this should be avoided, as it is deficient in the product both of its seeds and herbage.

Sutton's Improved Italian Rye-grass.—This variety originated with Messrs Sutton & Sons, the eminent seed merchants of Reading, in whose sale catalogue for 1868, it is stated to be "the best and most productive in cultivation, extensively used at, and favourably spoken of, in connexion with the Metropolis Sewage Farm at Barking."

The Farm.

ROUGH CULTIVATION IN RELATION TO THE TEMPERATURE OF FARM SOILS.

seems but a truism to state that much of the success of farm cropping depends the degree of heat which is in the soil, e uniformity with which that is main- l; and yet it is a truism which is often oked, and we believe that the points cted with it are of vast importance, and , if more fully investigated than they been, will yield results of higher prac- value than has yet been thought of. more uniformly we maintain the tem- ure of the soil, the more uniform must e results, so far as the soil and its influ- are concerned. What is the exact tem- ure at which the soil will act in the beneficial way upon the crops which on it, is quite another question, one is not easily answered, and, if an- d, would not be easily vouched for in ce. Still, it is conceivable that there is le of cultivating the soil in such a way if we cannot obtain any exact tempera- hich we may conjecture to be the best, ay obtain a comparative uniformity of rature, and be able to raise the normal dinary temperature from the low point, retards and lessens, to the point which s on and increases healthy growth. in this way that, by thorough drain- we improve cold and wet soils, and, d a doubt, succeed in raising their ge temperature. How drainage does s well known. It is not with drain- but with cultivation of the soil, we now to do, as a means to the end we are ng of. It is a point to which, in the of this Journal, we have frequently re- —namely, the importance or influence ep, or, as we term it, thorough cultivation of the soil, and, by consequence, on its products; and we again take it up in order to draw attention to some points closely connected with this thorough cultivation of the soil, which carry with them a good deal of suggestive usefulness, and which have been given in a paper by Mr D. Greig, read before the Cirencester Chamber of Agriculture, recently published, on "The Improvement of the Temperature of the Soil in connexion with Agriculture." The points dwelt upon by Mr Greig have been the result of observations on the crops given upon steam-worked land and garden land, comparing these with observations made upon the crops grown upon land cultivated in the ordinary way.

In our articles on deep cultivation, we have referred to the disputed point, as to whether injury is done to the arable surface by bringing up the subsoil to mix with it. Mr Greig is decidedly of opinion that the subsoil should not be brought up to the surface, but that the land should be stirred to the greatest possible depth. The reader will remember how, in a recent paper on this subject, we drew attention to the distinction between the two processes here named, the important difference between which Mr Greig being fully aware of. This deep stirring—the case supposed being heavy clay land, which has grown wheat, and designed for a green crop in the following spring—of the soil is done in autumn, the manure, if necessary, being applied at the time of working the land, so as to be well mixed with the soil. We presume that Mr Greig means, though he does not say, that the surface is to be left, as it should be left, in a rough state; for he recommends that the green crops on this sort of land should be sown in the spring, entirely upon the frosted land. Now, this fine tilth can only be secured in perfection by the action of the winter's frost and atmospheric influences; and this action can only take place properly where the land is left rough. This is a point we have always insisted upon, and it should be followed out where success is desired. Mr Greig insists strongly upon another point, which, seeing the high importance of it, we have also insisted upon—namely, the avoiding of the treading of the horses upon the land. And it is here that the steam plough or steam cultivator comes in to aid the farmer, and aid him effectually.

MIXING SOILS—CLAY BURNING.

IN an article we gave some time ago on the mixing of soils of various qualities, we pointed out various modes of doing this, and, amongst others, the treatment of adhesive clays by the admixture of lighter soils. One method, not there detailed, of treating cold, stiff, adhesive clays is mixing them with nodules of burnt clay. This, by some, has been claimed as a modern method, but, like some other so-called modern plans or investigations, we find that, on the contrary, it possesses a high antiquity. The Romans used it twenty centuries ago; and to come down to more modern times, Sir Humphrey Davy, nearly half a century ago, wrote of it thus:—"The process of burning renders the soil less compact, less tenacious of moisture, and, properly applied, may convert a matter that was stiff, damp, and, in consequence, cold, into one powdery, dry, and warm, and much more proper as a bed for vegetable life." In our article formerly alluded to, we named a variety of materials which can be employed to lighten clayey adhesive soils; but, so far as experience goes, it points to burnt clay nodules as the best. The process of making these clay nodules is not a difficult nor an expensive one. Where waste wood, roots of trees, &c., can be procured in abundance, they may be used to calcine the clay. The various materials should be disposed carefully on a vacant space of ground; the heap should be commenced with the lighter materials, as twigs, chips, shavings, dried weeds, leaves, &c., capped with heavier pieces, as branches of trees, and the like; then on those some lighter combustibles again, and thereafter layers of heavier ones, so that in process of time a mass of material may be made, open, light, and yet of sufficient strength to bear the weight of the heavier materials, as roots of trees, blocks, &c., which are to form the chief source of the continued heat required, and until the roots are well kindled. Round these combustible materials place the clay to be burnt, disposing it in such a way, and gradually adding to it, that wherever the flame bursts out it may be suppressed. The great aim is to maintain the slow combustion, which will harden the clay into nut-like nodules, without powdering it like dust, and to have the colour of these, when finished, rather black than a clean colour.

Where such woody refuse as has been named above cannot be got in sufficient quantity to keep up the dull slow combustion necessary, coals must be used. Of these the dross or screenings will do. It will take one ton and a-quarter of these screenings to burn fifteen cubic yards into nodules; if the clay is strong and adhesive, the same cubic quantity will only require a ton. The fire is commenced by using wood chips, &c., or by surrounding a mass of ignited fuel from a furnace—if one is at hand—with largish lumps of coal, until the central mass is fairly ignited; the small coal being then heaped in bulk proportioned to the weight of clay to be burnt. Before, or at least soon after, igniting the mass in the centre, the whole should be d with the clay in a layer from 6 to 18 inches in thickness, according to the ty of clay. When the fire burns through ss of clay, the fire is drawn down with uniformly distributed, and made into , on the top of which, and over the surface, the small coal-dross, or screen- re strewed uniformly, and this again d with a layer of clay, varying in thick- om 6 inches to a foot. The great art in burning the clay by this method is to draw the fire at the stated intervals, so that it be spread uniformly over the heap which is formed to receive the fresh fuel and the clay. According to circumstances of locality, price of labour, fuel, &c., the cost of burning clay by this method will vary from one shilling to half-a-crown per cubic yard. We have known it to be as low as sixpence under favourable circumstances.

LIEBIG ON FARM-YARD MANURE.

discussing the various important points onnected with the subject, Baron Liebig in detail, some experiments made on fields in Saxony. It is not within the of the present series of articles to give in like detail, their principal features will erred to as we discuss the various points. able given of the quantity of farm-yard employed in certain cases, with the nt of produce as the result, shews a very kable diversity in the statements of esults. The most likely answer to uestion as to what causes this diversity at the farmer gives as much manure has; or, he may go further, and te the quantity by what experience has him to be necessary to restore his land original fertility. When he gets to this , and sees that a greater supply of ma- fails to give a greater produce, he will, if a wise man, stop at this point. Thus, n scarcely be regarded as a mere ent, that in one of the cases cited e table above alluded to, one farmer 180 cwt., while another gave 314 f farm-yard dung. Thus, if the quantity anure given is not dependent upon e or mere caprice, but is regulated by a ct object in view, then the work of the r in manuring is favoured by a "law ture unknown to him, except by its s." Hence it is, that it is in the composi- f the soil itself, and in its condition, that we must look for that law which regulates the manure required by that soil in commencing a fresh rotation, to restore its fertility, weakened or lessened by former produce taken from it. And it is also evident that the quantity given must be proportionate to those constituents of farm-yard manure which are already existent in the soil; and thus that where these are largely present in the soil, that soil will take less manure than a field which has a smaller supply, to give in both cases a similar yield. We know that farm-yard dung owes its active constituents to the grasses, turnips, and clover; the inference, therefore, may be drawn, that "the quantity of farm-yard manure required on a field is in inverse ratio to the produce of clover, turnips, or grasses which the field can give when manured." The experiments already alluded to shew this, for the field which gives 9144 parts of clover received the smallest weight of farm-yard manure, 180 cwt., shewing that it contained the largest amount of dung constituents; while the field which yielded only 911 lb. of clover got the largest weight of dung, namely, 314 cwt., shewing that it contained the smallest amount of dung constituents. The clover, however, is not the only factor required to estimate the weight of farm-yard manure required in a field; for one of the constituents indispensable to the cereals (silicic acid), is present only in a trifling quantity in clover—hence it follows, that the quantity of farm-yard manure (straw manure) which is to be given to a field must bear a definite proportion to the straw constituents present in it. We find this exemplified in the experiments alluded to; for we find that in one field which gives the largest yield of straw, 1743 lb., the smallest quantity of farm-yard manure was given to it, 180 cwt.; while, on the other hand, the field which yielded the smallest produce of straw, 914 lb., got the largest weight of manure, namely, 314 cwt. While in the proportion of straw to grain in the cereal, there is only one true ratio, there are many irregular or unfavourable ratios; any excess of straw must therefore always reduce the value of the grain; for the mass and extent of the organs for the fermentation of the grain—*i.e.*, the bulk of the straw—must have definite relation to the quantity of straw produced. Hence, we may deduce this rule, when we know that in any given field the most favourable proportion of straw and grain for the production of grain, is one part of grain for two parts of straw; that it is necessary to manure the field so that this relation should not be disturbed in the increased produce which is sought to be obtained—that is, the manuring substances should be applied in such quantity, and in such relative proportions, that the composition of the soil may remain the same as it was before. Some manuring substances act most favourably in the formation of the herbaceous parts of plants, others in the formation of the grain; hence, it is not theoretically impossible to "maintain a certain uniformity in the soil of a field," but this cannot be effected by the system of farm-yard manure. We shall see as we proceed, that the composition of a soil is changed after each rotation by the continuous and exclusive use of farm-yard manure.

VALUE OF CHEMICAL ANALYSIS.

THE season of the year is now approaching when farmers are beginning to look out, or, at all events, to think about looking out, for manures for their spring crops. They rely, to a great extent, in their purchases upon the attestation of chemists as to the particular quantities of fertilising ingredients in the manure they deem most suitable for their lands. In fact, any one now-a-days buying manure or seeds without first having fee'd, or getting somebody else to fee, one or other of our chemists, would be regarded as foolish; and should his crop happen to fail, in the absence of a chemist's *imprimatur*, the verdict of the intelligent portion of the agricultural world would be, "served him right!" Indeed, so important are chemical tests considered, that the Highland and Agricultural Society of Scotland gives a chemist £300 a-year, in order that members of their wealthy association may have the privilege of getting their stuff analysed at a rate lower than is charged to others outside the pale of the Society.

The Highland Society also allows about £140 for manures and expenses connected therewith, to experimenters, or, altogether, well on—speaking in round numbers—to £500 a year in the chemical department. The Royal Agricultural Society, if we remember rightly, gives more; and we grudge not the expense, as we have always advocated science with practice. The in-and-out field system of farming, and the dependence for fertilisers upon the animals on the farm alone, would never do now. Our teeming population—even with all our shipping facilities for bringing in the produce of the shores of the Black Sea and the Baltic, and the great American Continent—could never exist were the land to be cultivated in the slovenly manner it was done in the days of our forefathers. We have learned the lesson, that mother earth, well treated, is the most generous parent in existence; but what we have not yet fully ascertained is, whether our learned soil-doctors are thoroughly capable ıg us as to how best to treat her; whether they have indisputable the exact component parts of al mixture submitted to their ıination.

ers may all remember that some here was much, and occasionally ıssion, and great difference of ıong agricultural chemists and mers, as to the commercial value as determined by analyses; and some chemists have declined to ıarket value to their tables of in any kind of artificial manure. abstinence nobody need comıg in mind the lines, that

> .e value of anything
> just as much as it will bring."

ıioned people can scarcely help ised and puzzled at the great ıat often exists between the similar samples of manures by emists, and are not unlikely to t, after all, is the value of this The chemists cannot satisfy one to the accuracy of their tests; :an we be satisfied? We'll e'en our own old way, and buy in the arket." And so science often e land does not get the quality desires, and consequently does ; she otherwise would.

been led to make these reading a report of a jury trial :er with reference to the value ısphate. The plaintiff was Mr n artificial manure manufacturer ımpton, and the defendant, Mr arried on business in Bristol in ıf a firm, Prangley & Co. The ɔntracted with the former for 300 erphosphate, which was guaranain "not less than 24 per cent. ɔhosphate, including the reduced phosphates." 126 tons of this [ay, and Mr Stephens declined to more, on the ground that what he ıs not equal to sample. The ɔt against Mr Stephens, but with not concerned; it is only with the conflicting evidence of the chemists (of whom there were no fewer than nine examined) that we have to do. The first who appeared in court, apparently for the plaintiff, was Mr A. Simpson, F.C.S.L., who said that "he determined the amount of soluble and precipitated phosphates. The result was 25.74." Mr Taylor, analytical chemist, Wolverhampton, had analysed samples of the manure. "The result was, soluble, 19.64; reduced, 6.95, or 26.59;" and Mr Jones, a partner of the firm of Mr Taylor, confirmed, of course, this report from his own analysis. Dr Alfred Hill, Professor of Chemistry, Birmingham, "found bone earth, soluble, 19.65; reduced phosphates, *which had been soluble*, 5.20; total, 24.85. The insoluble was 3.12." Professor Church, of the Royal Agricultural College, Cirencester, "found the soluble phosphate was 18.57; reduced and precipitated (we quote the report) 18.57 (!); insoluble, 6.28; giving a result of 24.85." Up to this point, therefore, so far as we can make out, although there are great discrepancies in the analyses, Mr Stephens would appear to have had a good enough bargain, better, indeed, than he was legally entitled to or had a right to expect. But there is another side of the question. Dr Voelcker, Professor of Chemistry to the Royal Agricultural Society of England, is called in, and on being asked as to his experience, declared "I have devoted the whole of my life to agricultural chemistry;" and he stated that his analysis shewed that the per-centage of soluble phosphates in the manure was 18.566, and of insoluble 14.48. Mr Nicolls, analytical chemist of Bristol, found only 16.48 per cent. of soluble phosphates in one sample that he analysed, and 15.4 in another. Mr A. Prangley, analytical chemist, could detect no more than 15.71 per cent., and 16.85 in two samples he had submitted to the test; Mr E. F. Teschmaker, Mincing Lane, but 17.25 per cent. of soluble phosphates; and neither of the latter two gentlemen believed that there was any test for ascertaining correctly the amount of reduced precipitates.

The statements of the last four, thoı disagreeing (as in the case of the h five), very materially, yet turns the evidence so completely in favour of Mr Stephens, that suspicious persons might be tempted to ask, are the per-centages of the various elements in manufactured manure determined by the particular side upon which a chemist is engaged? One thing is very evident, that the nomenclature, as here reported, has too much elasticity about it—as indeed it has in most analyses—and it would be well if chemists could agree to tell us exactly (if that be possible) how many phosphates, or how much ammonia, is *really* in a manure, without resorting to these puzzling per-centages described as "equal to." And, looking at the report we have summarised, it is not unlikely to be asked by unskilled folks, "when doctors so differ, who shall decide?" and for ourselves we should decline the office of referee, with thanks.

WHAT IS TO BE DONE WITH OUR SEWAGE?

AFTER all the discussion we have had, and all the experiments we have tried, in reference to the best mode of getting rid of our sewage in a wholesome, if not profitable way, it would seem that the problem is as far from satisfactory solution as ever. At least so Mr Bailey Denton informs us, and the *Times*, to a great extent, though in rather a hesitating way, endorses his views. It is not at all agreeable to learn, after all the money we have expended to secure cleanliness, promote healthiness, and increase the produce of the soil, that our efforts, save in one or two exceptional cases, have been almost in vain, that our so-called sanitary arrangements have more than once tended to increase the bills of mortality, pollute our rivers, and poison our lands. Is this really true? If it is, it is certainly very humiliating. But we are inclined to think that the failures in sewerage, and the positive evils occasioned by it, in some instances, have been rather exaggerated. A civil engineer, with theories and practices of his own, is very apt to see their importance in the best light, and the views of others in the like profession somewhat opaquely. Indeed, this is not characteristic of civil engineers alone, but of all professional men; aye, we may even write of all classes of men. We are not, therefore, attaching any special *penchant* for fault-finding to Mr Bailey Denton. He merely errs in common with others. For we cannot but think (while admitting that in some cases our rivers have been tainted with the discharges from our sewers, and that malaria has been also thereby induced in low lying districts) that, on the whole, our death-rate has been considerably lessened by the sewering, imperfect as it may be, which has taken place within recent years. And we can hardly believe, with cases of irrigated lands before us, such as those of Craigentinny and Barking, that sewage passes "from the sewer into the land to corrupt and pollute it." This is not the experience at the places we have named; the sewage is the means of fertilising barren land to an extent which has been marvellous to all agriculturists; and still greater matter of wonder to many that, where circumstances permitted, sewage was not utilised in this way to a much greater extent. But that there is still much to learn in connexion with the proper sewage of towns, and the best means of applying the sewage to healthful, not hurtful uses, no one will deny; and Mr Bailey Denton aids us considerably in our lessons when he distinguishes the difference between a sewer and a drain. His definition, although known to some engineers, was not unnecessary, as the popular mind is apt to regard the two words as meaning one and the same thing. Far from it; and the distinction must be thoroughly realised ere we can hope th t from any sanitary operations we undere.

Vell, then, it should be clearly understood t a sewer is not a drain; the latter being ended merely to draw out of the land ough which it passes the wetness that is it, and to exhaust that wetness, as far as pillary attraction and natural retentiveness ll permit; while a sewer is intended, or ould be intended, simply to discharge the fuse of towns as quickly and directly to the itfall as possible, without receiving any crease of fluid from, or allowing any that has received to escape from it and permeate ie soil. So far so good; and we quite agree ith Mr Denton, that "every means of excluding subsoil water from the sewer, and of dmitting it only into the drain, should be igidly carried out." He adds, "the more bundantly water is used in a town and lows down the sewers, the more completely vill any escaping sewage matter it holds in olution penetrate far and wide into the soil n the neighbourhood of sewers, to rise with etained moisture, by capillary attraction, to he surface. It is thus the earth becomes excrement sodden;' it is thus the air becomes 'excrement reeking.'" But, then, such scape can only arise from imperfect means f sewerage. No perfect sewer, whether constructed of bricks or pipes, and on proper evels, will admit of either leakage or perolation; and, therefore, when we find 'excrement sodden earth" and "excrenent reeking air," it may be at once et down that it is not the fault of e sewers, but the blame of those who made em. In fact, Mr Denton's arguments or ssertions about sewage appear to us much e same as those of the Highlandman's gainst whisky. The minister told Donald at whisky was a bad thing, and the reply as—"a fery pad thing, especially *pad* hisky." The analogy, perhaps, is not quite xact, as there are many people who deny at whisky, even of the best quality, is good; ut no one will gainsay that well-planned wers tend to the advantage and health of e community. What is to be desired, therefore, is, that Mr Bailey Denton, and others with thorough knowledge of how sewers and drains should be constructed, should inform municipal authorities as to the proper system of making these conduits, instead of (as the remarks of Mr Denton have a tendency to do) frightening them from entering upon any sanitary improvements at all. It is no use, it is discouraging to act the part of Cassandra, as Mr Denton does; better take that hopeful view which is taken by Mr Wyatt, of Bedford, who, in reply to Mr Denton, quotes the example of the town from which he dates, as an example of the beneficial effects of good sewerage. He says:—

> The whole area of Bedford is sewered, and, as the town is divided by the River Ouse, there are two levels in the system; but the sewers eventually come to one main, which is carried eastward to Newnham, about a mile from the town, where the sewage all falls into a tank, and is then raised by centrifugal pumps, worked by two twelve-horse engines. From the lift the sewage passes by gravitation to fields under cultivation, where it fertilizes various crops of rye-grass, wurtzels, &c., becomes "matter in the right place at last," and assists in repaying the expense of the sewerage. Here, also, is realised Mr Bailey Denton's idea, that no sewage water should pass into river courses until it has passed through, not merely over, land; and so completely is this effected that the effluent water is very small in quantity, perfectly transparent, inodorous, and tasteless. It is quite true, as he suggests, that deep sewers, in porous soils, will lower the underground water level; they have done so in Bedford, and the consequences are, that the foundations of houses previously generally saturated, are now perfectly dry, cellars are completely drained, and shallow wells entirely emptied. By many persons here the latter result was deemed a misfortune; I consider it a blessing, for it is notorious that these wells were supplied with soakage water more or less polluted. A plentiful and constant supply of water raised from the rocky beds of the oolite to a high-level inclosed reservoir, more than compensates the inhabitants for the loss of that well water.

What has been done in Bedford can be more easily done in most other towns in the kingdom, as most of these are situated on better levels. The whole matter lies in a nut-shell. Good seweraging is of the highest importance; bad sewers are the result of bad engineers, and, in future, incompetent persons ought not to be employed to construct them.

A FEW WORDS ABOUT CATTLE.

THE many signs around us which tell of approaching winter, remind the prudent farmer that his cattle will soon, if they do not already, demand all his attentive care. No time, therefore, should be lost in making arrangements for their winter housing and feeding. So far as the supplies of food are concerned, it is fortunately the case that in many districts the root crops are, if not above, certainly not far below the average—a marked contrast to last year, when there were no root crops at all in many, too many, districts. Still, notwithstanding the fair supply, it is always the part of a good farmer to economise his food, not simply with the view of saving, but with the higher aim of getting as much meat on his cattle in return for the food they consume. How to do this with the utmost practicable degree of certainty is a difficult problem, and one the solution of which taxes to the utmost the skill and the patience of the farmer. That it is a difficult problem is at once seen, when we consider the diversity of opinion existing amongst farmers as to the best modes of procedure. True, this diversity may be to a large extent accounted for from the diversity of climate, locality, and other circumstances—points which no true agriculturists will overlook or ignore. Still, these circumstances, important as they are, do not account for the diversity above alluded to, for you will find two farmers, under precisely the same circumstances of climate and locality, or nearly so, carrying out modes of feeding and management very different in character. Take, for example, the primary question—what is the best mode of housing stock in winter? Here we have no fewer than five modes in use, each of them eagerly advocated. These are, first, the open court; secondly, the large open court with shelter sheds, or what is called in the north of England the "curtain" system; thirdly, the small court with shed, or what is called th "hammel" system; fourthly, the "box"; and fifthly, the "stall" system. It is no within the province of this brief paper to glance at the points of merit which each o these systems possess in the opinion of thei advocates—although we may not be out o place when we say that possibly the bes arguments, physiological and economical, ca be brought forward in support of the "hammel" system. It is more the object of this pape to draw attention to a few points concerning the management of cattle in winter and the first point to which we would refe is this, that we believe mistakes are ofte made in keeping valuable stock too long ou at pasture. Farmers are often tempted to d this in consequence of the fine appearanc which the grass often presents in autumn But it is worthy of consideration at leas whether the nutritive qualities of th grass are so valuable as to be a set-off to th undoubted loss which will be sustained b exposing the stock to bad weather, and a the chances of disease consequent thereo At the present time the case may not be s prejudicial, but it becomes most assured an certain when the grass is subjected to th action of repeated frosts. Further, a seco dary circumstance, which, although seconda under the aspect of the present discussion, still worthy of consideration—namely, wheth the gain is greater in getting longer feedin than the loss sustained by injuring the pa tures by feeding them too close for t winter's frosts. But that no great gain is t result of feeding stock too long in pastures evident enough to any one who will close look at the condition of his stock, and ca fully examine not only the quantity but t quality of the produce of such dairy cows may be fed on this system. But apart fr the fact, and we believe it to be a fact, t ss in condition is sustained by feeding ittle on grass which has at this season a uch less nutritive value than it possesses at rlier periods of the year—and this is surely reasonable view of the matter—there can e no doubt of this, that loss is further susained by subjecting the animals to the vicissiudes of such weather as we usually have n the autumn and early winter months. It s surely too late in the day for us now to iscuss this point, for all advanced farmers re agreed upon the evil arising from undue xposure, and the economical results to be btained by giving stock good shelter as well s good and judicious feeding.

In taking, then, the stock from the pasures to put them up for the winter, certain recautions are necessary, in order to avoid he evils which often arise when such precauions are not taken. One of these is, not to hange the system of feeding too rapidly. Sudden changes assuredly are productive of vils, more or less decided in character; and although they are worst at certain seasons of he year, as, for example, in spring, still they re bad at all times; the animals should, therefore, be accustomed gradually to the hange of food; a little of the new food being given on the animals being first put up, and this gradually increased in quantity. Another precaution to be taken is to avoid irregularity in feeding; this is a prolific source of loss in condition. It is surprising how rapidly animals learn to know the periods for feeding, and if these periods are allowed to pass they begin to be uneasy and to fret, and every one knows how poorly a fretting animal gets on. This brings us to the number of times in a day the animals should be fed. Although it is a better rule to give them a little at a time and often, than too much at a time and seldom, still the rule may be carried to an excess, and the food given so often that the cattle are disturbed too frequently, and have not the time allowed them to ruminate which a healthy animal requires. As a good ule, we should say that feeding four times day is the maximum, three times the inimum. The evils arising from long fastings must be carefully avoided, for after a long fast the animal eats the food far too quickly, and takes too much of it, to allow digestion to go on properly; on the contrary, it is sadly interfered with, and wind is germinated, the cause often of complaints of a distressing character. A good deal of attention is required to know how much should be given to cattle. If too much is supplied the animal gets to loathe his food, and all of us know the bad effects of this. Some attention on the part of the cattle-man will be necessary for him to ascertain how much should be supplied; observation will soon shew it him. The food, when supplied, should be consumed with an appetite, but not so quickly as to bring about choking, or to load the stomach.

The question now arises, should the stock have certain determinate quantities given them daily, or should they be allowed to eat as much as they like? In other words, is it the fact, that the more an animal eats the more profit will be got out of him? The whole point turns upon the question, Will all the food taken by an animal, of its own free will, be assimilated? This question involves so many points, chiefly physiological, that it is by no means easy to answer it. Reasoning from analogy, one would be inclined to say that an animal may be safely left to eat as much as he pleases, as he will leave off as soon as he is satisfied. But it is by no means so clear that this "point of satiation," so to call it, is that up to which the food taken will be usefully assimilated in the body of the animal. The probability is, it would be more beneficial for the animal to stop at this side of satiation, than to go up to, or even near it, for we know, at all events it is so considered, in the case of ourselves, that it is much better to rise from a meal with a slight appetite than to go on eating till all appetite is gone, and satiation sets in. We confess that there is no small difficulty surrounding the question now under consideration; for, if we admit that it is the safest plan not to allow the animal to eat till he is satiated, we shall be of necessity compelled to stop the supply of his food at a certain point. Now that point may not be the right one; it may, in fact, be just the point at which loss is sustained by stopping the supplies. The happy point is, we admit, difficult to hit; although it is satisfactory to know that a judicious observant man will very rapidly learn the peculiarities of the animals under his care, and know how much to give, and when to stop. One point is very clear to our minds, and that is, that the animal would have his food taken from him the moment he is observed no longer to eat it with heartiness, but to commence to snuff at it, and, literally, turn up his nose at it. Our readers who know about cattle will know what we mean if the words we use do not clearly indicate the meaning. If the food given to the animal is eaten off at once, and with an apparent zest, the chances are that the food is going the right way to be assimilated.

These remarks evidently point to the greater importance of the system of feeding stock by giving determinate quantities of food, rather than to the plan of allowing them to take as much as they choose. They also indicate this, that more care will have to be taken by the feeder, by the plan of "portioning" out food than will be required in the other, a greater demand made upon his powers of observation, and upon his patience and kindly supervision. But these are precisely the characteristics which go far to ensure success in feeding, a success which is shadowed forth in the proverb—"the eye of the master fatteneth the ox."

Where stock is fed in stalls, it is of essential importance to secure good ventilation. While as *equable* a temperature is to be maintained as possible, or can be maintained, that temperature should be moderate in degree not so high as to cause the animals t perspire. It should be remembered tha the change from the open pastures to th closed house is a very great one; and i likely to cause in the animal abnormal change through the abnormal circumstances in whic it is placed. Over perspiration will b one of these results, and, if possible, shoul be carefully avoided, for it is unquestionab injurious to fattening stock. Much of th evil arising from undue perspiration wi be obviated by keeping the body of th animal perfectly clean. To this end th currycomb and the straw wisp should be fr quently used.

TREATMENT OF SHEEP IN AUTUMN.

IT is too well-known to many flockmasters that one of the greatest difficulties connected with the management of sheep is to keep them right during the autumn months. Upon the success with which this is done, depends, in great measure, their condition in spring, and the numbers and strength of the expected lambs. It is of the utmost importance, we believe, to take special care to have the ewes in good condition before being put to the tup, this being secured by careful and judicious feeding for some four or five weeks before this period. Where grass is good and plentiful, some prefer it for this purpose to turnips; but these may be u along with green food, if judiciously gi It should be remembered that grass not so nutritious in the autumn as at ea periods of the year. It is also impor to have the tups in good condit These points seem very common-pl but it is, nevertheless, the fact, that, c mon-place as they are, they are c overlooked; it seems simply reasonabl suppose that poor parents will make progeny. But not only is good food n sary to secure good condition, the wa which that is aided by other circumstanc

nportance. And here we insist upon
of shelter to sheep during the cold
n and winter. We have often offered
upon this point, but what we have
ts importance cannot be too often
Sheds with yards and racks at-
we believe to be indispensable
to every well-managed farm where
kept. To these sheds, if the sheep
during the day upon the turnips,
ld be turned in at night, although
le farmers prefer to cart the turnips
ds, in place of turning the sheep upon
ips. The fact, which seems well
d, that sheep fed under the usual ex-
all the vicissitudes of the weather,
h less than when fed under shelter,
, or should be enough, to turn the
of farmers to this department of
al economy. The difference alluded
one important experiment shewn
loss of 2 lb. per week per head in
f the sheep exposed to the weather.
nly is somewhat suggestive, that
agree as to the good effect of
yness, and warmth upon cattle, the
not supposed to be beneficial in
of sheep. To meet the require-
the case, some erect rough straw-
urdles in the field upon which they
are folded; but although these do shelter the sheep from the full force of biting blasts, they do not shelter them sufficiently—certainly not from rain—while they are of necessity compelled to lie upon the soft and puddled earth. Now, dryness we believe an essential feature in a shelter, and this can only be obtained in proper sheds, with courts attached. One reason why some have not succeeded in obtaining good results from shelter is, that they have overlooked one of the chief points desiderated in it. The shelter here alluded to has been the ordinary fold or straw yard. Those who use this system forget, or overlook the fact, that sheep are always best when upon hard ground, not upon soft and yielding material. A sheep will, if left to choice, invariably prefer a hard part to lie upon. The floor, therefore, both of the sheds and the yard should be paved, asphalted, or otherwise rendered hard. The dryness essential to the animal's comfort, as well as the hardness, will thus be secured. This plan will also afford means by which the manure can be saved with great ease. It would be advisable to have the sheds and courts adjacent to a permanent pasture, into which the animals could be turned for a wider roam than the yards would afford.

SQUATTING; OR SHEEP FARMING IN OTAGO.

BY EDITOR.—The following paper by a valued Correspondent in New Zealand will speak for itself.]

sometimes see your magazine and have been delighted with its articles. They have proved an inter-
ation from the stern toil of forming a home in the wilderness. It occurred to me that some of your
ers might find amusement, if not profit, in knowing how such things are done on the other side
t. With this view the accompanying remarks have been written for insertion in *The Country Gentleman's*
]

y be interesting to some of your
lers to compare the mode of sheep
ere with that usually followed in
The sheep are of the merino
stly imported from Australia.
the Crown lands of Otago were first
en to the sheep farmer, there was a
rush for runs by all who could muster a few sheep, one of the conditions being, that a number of stock, in proportion to the extent of country proposed to be occupied, must be placed on the run within a stated period. As there were almost no sheep in the province then, and as sheep were being almost given

away in Australia, the importation of sheep began in earnest. The losses were tremendous, yet sheep must be had at all hazards or runs must be forfeited, so shipment followed shipment in quick succession. For the most part they consisted of culls from the overstocked runs of Victoria; and in many cases had been newly dressed to pass the inspector. The recent dressing, the sea voyage, and exposure to a colder climate, more than decimated the flocks. The roads by which they travelled were strewed with their carcases. A shipment of 3000 has been reduced to 500. Often, also, the flocks on landing were declared scabby by the inspector, and thrown into quarantine, where many died of starvation, or were killed in curing. Still, they were poured into the province, until most of the run-holders could boast of a flock of sheep. Thus the sheep at commencement were in general decidedly inferior, and many of them died before being acclimatised; but those that survived, rapidly improved in condition on the rich and hitherto untrodden pasture. The wool also was inferior; but not until his run was stocked, almost to its carrying capacity, could the run-holder (*colonice* squatter) turn his attention to improving his stock.

To one who has been accustomed to the Cheviot sheep, and has admired the models of symmetrical beauty exhibited by such men as Mr Brydon, late of Moodlaw, the merino sheep appears the very embodiment of ugliness.*

For the information of those who have never seen a sheep of the merino breed, we may note a few of the points of a well-bred merino of the Australian breed:—Wool all over; nothing bare except the tip of the nose and the hoofs; nose white; the head, if it could be seen for wool, finely formed, and the eye lively, and surrounded with a reddish ring; wool close, fine, and lustrous; the skin of a pinkish hue.

The symmetry of the body is not regarde as a point; but, compared with the Cheviot the hind legs of the merino are long, an seldom well-turned; the loins high, th shoulders low, the counter narrow; and th neck long. The ram is furnished with immense horns, finely convoluted; the ewe is for the most part, destitute of horns.

This inversion of all our ideas is accounte for when we consider that the sole object o the squatter is the growth of wool, and fo this the merino breed is, beyond comparison the most suitable.

When being stocked to the extent of a sheep to 50 acres, wedders could be obtained from the runs weighing 70 or even 80 lb. or when, in the heyday of the gold discovery fat wedders could be sold for more than forty shillings—it was profitable to produce mutton as well as wool. Now, when wedders, from runs stocked with a sheep to the acre and a half, do not weigh more than 50 lb., and when mutton is sold at twopence to threepence per lb., the merino sheep may be said to have resumed its position of a wool-producing breed.

To increase the quantity and improve the quality and condition of the wool, the runholder devotes his energies. With this view, first-class stock of the Australian and German type have been introduced. The Australian sheep are originally of Spanish extraction, but they have been so long acclimatised and improved as to claim to be regarded as a distinct type.

Into the vexed question of the comparative merits of the Australian and German it is not necessary here to enter further than to state that the wool of the latter is shorter, closer and has a greater quantity of yolk in it hence shorn in the grease it weighs more but the clean wool of the two fleeces come nearer equality. The Australian has the advantage in point of length and softness Each, however, has its defenders, and a goo wool is produced by crossing Australian ewe with German rams.

Many of the squatters are now able to cu from their flocks old and inferior ewes an the coarser sort of lambs, which are, as ye

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* We once shewed a shepherd, newly arrived from the Ettrick Forest, what we considered a good merino ewe, and asked his opinion of her. "You should cut her throat and throw her down the *waiter*" (water), was his reply.

by others who have not stocked their
their carrying capacity.
in the means adopted for forwarding
l to market, properly got up, that the
chiefly excels the sheep farmer of
d. At first, most of the wool was sold
grease, in which state the average
of a fleece may be stated at 5 lb.,
this 2 lb. may be deducted as grease
t. Now, granting that the wool sold
full value in the home market, the
r soon found that he had to pay cart-
hterage, freight, insurance, *et hoc genus*
on 2 lb. of dirt and grease for every
horn. Hence, as a rule, he now washes
ep. But from the quantity of yolk in
wool they are difficult to wash. In-
he greasier sort may be drowned ere
y washed; if the water be not soft and
tely warm. To plunge such across a
stream of cold water, as we have seen
Scotland, and sometimes even here,
congeals the yolk and hardens the
An improvement on this is a creek
d so that a ley is formed by the yolk in
n, and each sheep, ere it escapes,
to swim into clean water, or better,
o pass under a waterfall. But a new
sheep washing is dawning here as well
ustralia, by the introduction of hot
oaks, followed by cold water spouting.
ll try to explain one of these hydraulic
washes as well as we can without a
n. It consists of two parts, a hot water
d a hydraulic spouting battery. The
after being yarded into a large pen,
opens into a smaller one—both covered
attens—are forced singly, through a
door, into the soak. The soak is a
ough of three compartments. It has
ttoms—the lower of closely-jointed
perfectly water-tight; the upper, a
hes above, perforated to allow the dirt
and settle on the lower bottom, from
by removing the upper, it can be
ed and the trough cleaned out by
of a plug hole in the lower. The soak
lied with hot water from a boiler by
of a pipe, and with cold by a canal
e stream or pond. It is heated to 114 degrees Fahrenheit, and mixed with about 10 lb. of soap and 3 or 4 lb. of soda for every hundred sheep. The number of sheep each compartment contains depends on the number of batteries employed, at the rate of about three sheep for each battery. Each sheep requires to remain about four minutes in the soak, passing from one compartment to another, through doors which slide up by means of pulleys and weights. Care is taken that in each compartment they are immersed, so that the wool is thoroughly soaked in every part. From the third compartment they are brought forward to a small stage, to undergo the process of spouting with cold water.

Here you may suppose the sheep standing between two upright boxes, some 4 feet long, about 14 feet high, and as narrow as convenient. In the front of these boxes, conceive a few cuts by a saw, drawn lengthwise and nearly horizontal. But the hand is held at different angles in making the cuts. For the higher, the hand is held down and the point of the saw up, for the lower, *vice versa.* Now draw the small sluice, and let the boxes be filled with water. From these saw-cuts issue jets of water, the higher playing downwards on the back, the lower upwards on the belly, and the intermediate horizontally on the sides of the sheep. The water having a perpendicular height of about 14 feet, is discharged from the jets with such force as thoroughly separates the locks of wool, and leaves the fleece as white as undriven snow. The sheep remain under the battery from twelve to fifteen seconds. They are then allowed to escape through battened pens to clean pasture, to await shearing.*

Several such sheep-washes have been erected in Otago and Southland, and the cost may be stated at from £400 to £600.

The shearing next calls for attention, but this must be reserved for a future communication. Meantime, with anxious wishes that the British wool trade may flourish, I subscribe myself—*Old Identity, Otago, N. Z.*

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* The above is a meagre description of a sheep-wash invented by Messrs Hamilton & Geddes, late of Moffat, Dumfriesshire, now of Mount Chadwell, Victoria.

TRANSIT OF CATTLE BY SEA AND LAND.

IT seems to be perfectly well proved that, with all our humanity, we are really inhumane. There is an old proverb, to the effect, that "a merciful man is merciful to his dumb beast," and it has been fully substantiated that we have not been merciful. The charge cannot be denied; and, so much for the honesty of all concerned, there has not, so far as we have noticed, been any attempt at denial. Judgment has been allowed to go by default. The cruelty has been tacitly admitted by all: the only difference now is as to the proper remedy. We have hitherto ill-treated our animals in transit; how can we now best shew them kindness? We all wish to be philanthropists towards the dumb creation now; in what form can our feelings be most judiciously expressed? At this point the differences of our humanitarians begin, and so keen are their disputes that outsiders are almost compelled to the belief that the former cruelty to the beasts would, were it possible, be now exercised upon their masters. The spirit seems there, but the power, of course, is absent. And well it is that it should be, for we know from Canning, that the "friends of humanity" are not over kindly when they don't get things all their own way. "The needy knife-grinder" found out that to his cost when his machinery and himself were unceremoniously toppled over into the ditch by one of these loving gentlemen.

Standing apart, say as referee, and impartial as an umpire should be, we must say, as all say, and with stronger emphasis than some, that the way our animals have, up to this time, been treated on long journeys, railways, and steamboats, has been utterly disgraceful to us as a nation professing to have tender sympathies, actuated by Christian motives. Stock are crowded into filthy trucks, exposed to all the untoward incidences of the weather, to the fierce sun in summer, and the biting blasts of rain, sleet, and snow in winter; often for hundreds of miles entirely deprived of food and water; and also subject to detention for hours at numerous sidings when on a long journey. In fact, it has sometimes appeared to us, when we looked at the panting or shivering animals, wedged together in their dirty, unhealthy waggons, that their owners regarded them as nothing better than overgrown Kilkenny cats, and trucked them with the view that, like the ferocious feline specimens alluded to, they might get rid of themselves. No wonder, under such conditions, that we so often find animals coming into market with staring coats and lolling tongues, that their first rush should be to the water-trough, that the prices are deteriorated in proportion to the deterioration in their appearance, and that it is matter for congratulation when they have escaped some contagious disease. Steamboats are no better provided in the way of accommodation for stock, and greater cruelty is oftentimes shewn them by brutal sailors.

What now is to be done to remedy this state of matters? Two or three years ago some precautions were taken with regard to the cleaning of trucks and steamboats, and for a time the compulsory regulations were enforced pretty well; but we are greatly afraid that since the excitement and alarm consequent upon the prevalence of rinderpest have been allayed, that so much attention is not now paid to cleanliness and disinfection. But what is really wanted, besides cleanliness and the use of disinfectants, is an improved kind of waggon for railways, and a different kind of fitting up for steamboats in the habit of conveying stock. We must have waggons that will protect cattle from the inclemencies of the weather, and steamboats so constructed as to secure cattle as much as possible against being suffocated, smashed, and often drowned in a storm. What are the plans by which these two essential s in connexion with the transit of cattle e obtained, are the questions which been sent by the Privy Council to rious Chambers of Agriculture in the y.

y are likely to have many varied opin- Indeed, we scarcely envy the Council's f drawing up an acceptable report from rious conflicting views they are certain to aid before them. At present, we have in favour of watering and feeding as they proceed on their journey, ving trucks supplied both with water dder, so as to obviate the necessity of ges for watering and feeding. Such a has been invented by Mr Reid, Gran- d, as it seems to us, with a little im- nent in ventilation, perhaps, and other minor details as would easily suggest elves, that it would serve the purpose for it is designed very well. We cannot see force in the objection that has been to it, that the troughs could not be kept clean of excrementitious matter. Still less are we convinced that stock, as has been alleged, would not eat and drink when the waggons are in motion. The other plan is to have watering places at certain stations, with mechanical appliances for raising up troughs with water alongside the trucks, so that the animals might slake their thirst.

We are rather inclined to favour the first plan, but before giving in our adhesion implicitly to any suggestion, we await further evidence, which the Privy Council's report, after hearing the statements of the Chambers, is certain to supply. The Council also invite communications from all individuals who are interested in the kindly treatment and welfare of stock, and who have suggestions to make in reference to the securing of the great and good object aimed at. Such persons cannot do other than respond; and from the mass of evidence supplied, we trust that the Privy Council may evolve some satisfactory plan for carrying animals alike by sea and land.

HE NEW CURE FOR FOOT-AND-MOUTH DISEASE AND PLEURO-PNEUMONIA.

our last Number we drew the special ttention of our readers to the sulphur liscovered by Dr Dewar, of Kirkcaldy, omised to give, in a succeeding paper, further remarks and facts in connexion t. That promise we now propose to n. We have, in the title to our present called it the *new* cure, yet, neverthe- slowly do improvements proceed, that ow nearly five years since the cure was ced to the notice of the public. We afely assert that daily experience of rous fumigation, both in the cases of nics affecting men and the lower ani- eads us to place the most implicit faith fficiency as to the prevention and the tion of many familiar, but otherwise in- le ailments.

The practicability of such an expedient had not been for many days mooted, before an unexpected testimony in regard to its value was gratuitously offered from many quarters as to the disappearance of ringworm, mange, lice, and other ailments common to cattle during at least the winter months, as observed by some of those who had been induced to try the simple measure as precautionary against more serious disaster; and within a few weeks the agreeable intelligence was accorded that pleuro-pneumonia, which had been endemic for more than thirty years in one large dairy, and of frequent occurrence in several other localities, had not less strangely abated in presence of this novel appliance. Thus encouraged, the discoverer did his utmost to have the agent brought face to face with the cattle plague, which was then in Fife, as elsewhere, unhappily committing such terrible devastation; but the stringent orders of the Privy Council prevented any opportunity of his demonstrating its true value by the embargo which was therein laid on the shifting of cattle, His purpose was to have experimented upon cattle of his own, by exposing them to every reasonable condition of circumstances under which infection might reach them, and to have tested whether the system which he advocated was sufficient for their conservation. In this attempt he was foiled, however, notwithstandanding that the scheme had the advantage of the active sympathy and cooperation of men who occupy at the present moment the very highest position in the country; and for a time he was obliged to rest satisfied with the negative experience of those who, by hearty attention to the means recommended, became conspicuous by the singular immunity which they enjoyed, and were enabled to pass through the period of anxiety and ruinous loss unscathed.

These difficulties notwithstanding, facts accumulated; and as they gradually but steadily arrayed themselves in a form which could not be gainsaid, renewed attempts were made, through legitimate channels, to enable Dr Dewar to attain the very important object of submitting his process to the *experimentum crucis*, an ordeal to which "bubbles" are not by their promoters readily subjected. As auxiliary to the accomplishment of his end, various memoranda, which we may hereafter give to our readers, were procured; but these documents, although emanating from men whose reputation is cosmopolitan, and supported, as they were, by the energetic assistance of Major Cumming-Bruce, then M.P. for Elgin, proved unavailing under the circumstances. Circumstances, not necessary to be named here, led to the following issue, the facts of which have not hitherto been published.

On the first Saturday of January 1866, having previously negotiated with a farmer, five miles distant, for four stirks, (the sole survivors of a lot which were swept off by cattle-plague, but which had been within twenty hours dul licensed for removal to the shambles), D Dewar having aforethought obtained th necessary order from a sympathising Justice proceeded to "lift" his purchase. It wa pitch dark when he arrived, but by the aid o a lantern he was enabled to have an imperfec look at the animals, which were located in court; but he was at no loss about verifyin the disease, of which a late companion wa dying a few yards off. Out of regard to th safety of neighbours, and with a natural desire to get their somewhat hazardous journe completed with the least possible delay Dr Dewar took the unusual precaution of having their feet fastened, as sheep's are so adjusted, and then comfortably placed, two and two, among straw in corn-carts, and quietly conveyed to his stable where everything was in readiness to receive them. When the carts arrived, any one may judge of his horror, when informed that two of the beasts were dead. He declined to take delivery of the carcases, and bundled them back to the place they had been brough from. What was the cause of their death can only now be conjectured, but it will a least be admitted, that the experiment was undertaken under but ominous circumstances The remaining two were at once placed in an already fumigated stable, and were in reality kept for some days in an atmosphere in which a taint of the preservative agent was, by frequent repetition, constantly maintained. They entirely escaped the effects of the contagion to which they had in common with the others, been exposed, and within one week were the only living representatives of a stock of which the farmer had with warrantable pride, been the but recent owner. That they should have thus been so fortunate, may be partly accounted for by their being removed from an infected to a perfectly healthy locality; but when it is taken into consideration that they were, thereafter during the continuance of the pestilence daily exposed to further risk by over persistent visits paid by the doctor to infected byres, the living occupants of which he freely examined, besides being pre

t many *post-mortem* examinations, while
idiously neglected all the prescribed
ires about "washing the hands and
ng the boots," before coming into con-
ith his own cattle, it is not unreasonable
im for the process, to the keeping of
he had committed them, a large share
: credit for the perfect exemption from
kind of illness which they enjoyed,
he time came when they were legiti-
r "wanted" for another purpose. In
r defiance of oracular dicta, they were
roughout upon straw and turnips which
een kindly supplied by friends whose
ses had recently been depopulated by the
e; and, in several instances, both the
raw and turnips were taken out of stores
not many feet from the door through
dead animals had been removed. Such
isolated it may be, and although only
rted by corroborative testimony of a less
e character, are at least novel and un-
lented in the history of this epidemic;
ad they met with that intelligent and
sed consideration from the advisers of
nment, upon whom their importance was
by different individuals, we should have
casion to regret the losses incurred under
laxe; and would have found ere this
e had a resource against epidemic dis-
which would have saved those respon-
for such matters the humiliating ad-
n, that notwithstanding all the advantages
periment with which they are and have
rovided, they find themselves absolutely
nt before murrain, which now prevails
nsively. But whatever objection may
e taken as to the want of more direct
ce in regard to this question, the same
t apply to either pleuro-pneumonia or
d-mouth disease, both of which have
the subjects of crucial experiments
sults which tend only further to estab-
e real value of the system under con-
ion. With the former of these maladies
e unfortunately had too many oppor-
s of becoming acquainted; but intract-
s it is generally found to be, we think
e discoverer is warranted in maintain-
t, in conjunction with punctilious attention to cleanliness, sulphurous fumigation may be relied upon as being equal to the speedy extirpation of this pestilence. Numberless cases have been reported where such happy effects followed its adoption; but that we have cited is sufficient to shew the absolute necessity for disinfecting the animals themselves by frequent and fearless repetition of the process, instead of placing dependence merely upon purifying the premises in which they are located.

We shall now present to the notice of our readers the particulars of the cases to which we have already referred.

A gentleman who, in the winter 1865-66, had, as a precautionary measure, adopted the suggestion as to stated fumigation, not only escaped the plague, but found, to his delight, that pleuro-pneumonia, which had been about his dairy for some indefinite time, relinquished its hold of his farm. For more than two years he had no return of his familiar enemy; but in the summer of 1868 it re-appeared and again asserted its supremacy by carrying off five cows. Although this gentleman had good reason to have faith in sulphur, yet upon the present occasion it had disappointed him, although his byres had been fumigated twice a-day ever since the return of the disease. Upon inquiry it was discovered that, upon the present occasion, it had been his wont to carry out the process *after* the animals had left the byre and been put to grass; whereas his earlier and more fortunate experience of it had occurred during the winter season, when his cattle were at home, and thus necessarily made participants in what was going on. The explanation, therefore, was an easy one, and he was advised to keep his beasts at home for two or three days, and fumigate them "within an inch of their lives." His remark was, "Well, I may as well try it, for I have lost all the cows the other way, and I will be ruined at any rate." He was met a fortnight afterwards, when he said that he "had carried out this recommendation, and that the pestilence had ceased to spread, and that he thought himself safe now." Another gentleman, last year, had two cows, one fan and well on for being fat, the other giving milk. The milch cow was taken ill, and the veterinary surgeon was sent for, but for some days his visit was delayed. When he came, eventually, he pronounced the patient to be very ill of pleuro-pneumonia, and prescribed accordingly; while he counselled that its neighbour should at once be sold, even at a sacrifice. The owner, who thought that he had reason to be dissatisfied with the manner in which his animal had been neglected, declined to comply with the advice which was urged upon him, and said that he would adopt the fumigation plan, and run all risks. This was immediately put into practice, and the result was the speedy recovery of the sick animal, without transmission of active *contagion* to its neighbour.

The third case to which we would refer, occurred in a byre of ten cattle. On the 5th February last, eight cattle were bought in Edinburgh market, and sent by rail to the middle of Fife. The truck was stopped at a certain place, that one ox might be left where there was a vacant stall. The others were forwarded to their destination, and when the truck was examined, the largest beast of the lot was found lying on its side, with the others trampling upon it. It was with difficulty got home, about half-a-mile off, where the privilege of a sulphurous atmosphere awaited the lot; it was tied up like the others, but, by accident, in the centre of the others, and there were no partitions in the place. The fumigations were performed upon their arrival; but in this case it was unfortunately too late to arrest the attack. On the second day the creature had a wasting appearance and look of abject misery; its breathing was much oppressed; it frothed greatly at the mouth; it could only get up with the greatest effort, and after the fourth day it never rose again. These symptoms, along with progressive emaciation and diminution of strength, continued for fourteen days, when the case appearing to be hopeless, the animal was ordered to be destroyed, and the cause of its fatal illness was but too easily verified as pleuro-pneumonia. There was in this case no opportunity of "isolating;" and, indeed the party was indifferent about it, as he believed that he had good grounds for faith in the preservative means which were being mos faithfully employed. So he resolved upon additional saturation with the fumigants, and had the ventilators stuffed with straw, and caused the sulphur to be burnt for three quarters of an hour four to six times-a-day during the patient's lifetime, so that practically there was constantly a taint of its fumes perceptible in the byre. No other precaution was used in the way of prevention, as regards the other animals, they all drank from the same water-bucket, and probably exchanged feeding troughs occasionally, and in the immediate neighbourhood of the sick one, and he ate hay from a rack common to both.

After his removal—the same system having been continued—the stall was scraped, and another ox was changed to it, while, on the following day, a fresh purchase was imported, so as to fill the vacancy. From this time all went well, and the inmates creditably finished their career some months afterwards without having experienced sickness of any kind whatever. It should likewise be mentioned that a lot of calves were located during the same period within twenty yards of the infected byre, and that they likewise escaped unmolested.

These cases surely will be accepted as strong testimony to the power of limitation and extirpation which this simple agent can exercise over a disease of recognised virulence and obstinacy; and the discoverer thinks they warrant him in challenging a comparative trial with any other system which has been, or may be, projected, for our protection from epidemic invasion. And he is, we believe, accordingly prepared to organise a series of definite experiments upon this subject, and is willing to bear any reasonable part of the risk himself, by experimenting upon one or more of his own animals, provided that it be distinctly understood that *truth* is what is being searched for, and that such facts as may be elicited during the inquiry be vigorously subjected to the crucial test before being accepted as irrefragable proof of the y of the means employed; and that ithout reference to any foregone is upon the matter, whether autho- otherwise.

is demand we think all the more , considering the unqualified terms he early experiments were accepted, ssed inefficiency of other modes, idence from time to time adduced of the position herein assumed.

h the convictions of the discoverer to the value of sulphurous fumiga- never wavered, he is nevertheless, , glad to say that more extended only hardens the basis upon faith in it rests, and leads him surance that it only requires to known to be more widely appre- carried into stated practice. The pidemic of *foot-and-mouth disease* iscoverer, early upon its appearance district, an opportunity of trying could do with *it*." On the 14th ought, at Kinross, eight Irish stirks, one lot and three from another. e put into a small 1½-acre field eight beasts which had been for ks under a box-feeding experiment, were all in perfect health. Two vly purchased ones appeared next especially exhausted, but this was to the fatigue—they had been miles—and heat to which they had sed, and nothing was thought of it, they were running at the eyes and y profusely, and seemed very foot- ere was no change worth noting urth day, when it was discovered f the others were merging into a ndition, one of these a fattening ox, d been in possession for months. ely the sick animals were driven to nises, about 500 yards off, put into yre, and fumigated without delay. ss was renewed about every second the first day, and upon the third, replaced in the field without fur- unication of the distemper. While in the small court, they were in contact with two pet calves going loose, and within a few yards of a cow and two fat bullocks, but these all escaped contamination.

In connexion with this part of the subject it may be permitted us to say, that the adoption of this mode of dealing wholesale with this epidemic, renders all elaborate application to the mouth, &c., quite unnecessary; for, as there cannot be any method of manipulation so gentle as this, nor so agreeable in respect to the way in which the remedy is brought into contact with the inflamed surface, so the object intended is at once and inadvertently attained, while the patient is saved much exquisite pain, which would otherwise be inevitable, from the contumacious manner in which bovine animals, more especially, oppose the most kindly intended interference.

In the course of the experiments now quoted some discrepancies now and then presented themselves, and which could not just at the moment be easily explained away; but the discoverer has now no hesitation in saying that they had their origin in the irregular and incomplete manner in which the process had been conducted, as also to the want of scrupulous attention to sanitary requirements, a thorough appreciation of the importance of which it is very difficult to bring home to the minds of those most nearly concerned.

Another explanation is, that it entails additional duty upon servants, which they soon find irksome, and therefore neglect. More than one instance could be named where the question came to be, whether due attention to the experiment should be required of an otherwise invaluable servant, even at the risk of his throwing up his place? But the masters had to give in. Nothing has proved truer than that "the eye of the master fatteneth the ox;" and we are confident, from our own observation, that no experiment of this kind can be considered as having been fairly tested, unless the details of it have been watched throughout by some one whose interest it was to have the truth ascertained, unembarrassed as to preconceived notions, and undeterred by any inconvenience to interested supervision might expose him. We will only observe further, that our belief in the value of this means of "combating" epidemic illness, is materially strengthened by the experience of those who have for years habitually resorted to it as a refuge during the prevalence of familiar scourges, such as measles, scarlatina, hooping-cough, typhus fever, &c., by the remarkable and hitherto unwonted immunity from such which not only individuals, but families, and even communities, have enjoyed, co-incidental, to speak cautiously, with its intelligent and stated employment; from the reports which have reached the discoverer from all parts of the world, as to the, at least, modifying influence which it seemed to shed over intractable prevailing maladies; and last, not least from the willingly accorded opinion of many of the "heads" of the medical profession, that there is something more than mere probability in favour of the inferences, which, we think, may fairly be deduced from the whole history of the experiment. It has a rival in carbolic acid, the virtues of which are, within certain limits, incontestible, but for the purposes at present under consideration, the one is, from its intrinsic condition, as circumscribed in its operation as a caged lion, whereas the sphere of the sulphur agent we believe to be boundless; and it possesses the unique attribute of being *non nunquam paratus* to comply with the command of "go, and it goeth," in discharge of the benignant errand which it is not less fully competent to accomplish.

MR MECHI'S EXPERIENCE.

AT the Annual Dinner of the Lavenham Farmers' Club, held on Friday week last, Mr Mechi made the following remarks, and we must beg for them a careful perusal. They contain home truths; and, much as a certain class of farmers are prone to ridicule and cry down Mr Mechi as a "tyro," and an "amateur farmer," they must bear in mind that he has now farmed Tiptree Hall for more than thirty years; that his experience is great; that his recorded experiments are more extensive and numerous than any other farmer in the kingdom; and, what is more to the purpose with a great many, that while Tiptree Hall, spite of its poor clay soil, is the best managed farm in the kingdom, it yields Mr Mechi a handsome per-centage of profit, as any unprejudiced man must acknowledge, who carefully studies his published balance sheet.

We must premise, that an important experiment is now being carried out near Lavenham, viz., the cultivation of the beet for the purpose of making it into sugar, and that a manufactory has been erected for carrying on the operation in connexion therewith. This is alluded to in Mr Mechi's speech.

After some introductory remarks Mr Mechi said—

> It would, perhaps, be expected of him that he should say a word or two about agriculture. He was only an apron string farmer, but still he was a partially practical farmer, a scientific farmer, if they liked. He had formed certain views upon the subject of the general agriculture of the kingdom; but before he proceeded to the general subject, they would allow him to say he had been very much interested in what he had seen that day. He had been exceedingly pleased and glad to find in their comparatively retired part of the country they were luxuriating in steam, not only in their fields, but also in the conversion of their produce into an article of every day use—sugar. The sugar manufactory was a very fine and splendid undertaking, and he had been exceedingly interested in going over it that day, and if they studied the operations going on in that manufactory they would find that science had had almost everything to do with rendering those operations profitable, and they would conclude that it would be well for agriculture to seek the aid of science to render its pursuit more profitable to themselves and advantageous to the community at large than at present. We were in a transition state—passing from the primitive pastoral state, when the people were few and grass superabundant, to one in

e was a treble population. We now had a of 32,000,000 instead of 10,000,000 in the These millions who were engaged in res required to be fed every day, and looked other countrymen, who were agriculturists, more than they used to do by the invest- greater capital and enlarged intelligence. e the question—has that been done or has of it been exhausted? He thought they e with him that we were only on the thresh- ricultural progress. It was only the other e discarded the flail for the horse threshing nd soon after doing so we found steam-power an horse-power, and could they not carry r and see if steam is not also applicable to tion of the land? To shew them the extent er of steam, he would tell them that he asked -driver that day what was the power of the 4 horse-power, which he was driving, com- with horses, and also the pressure per inch he was working? and he was rather to learn that at a pressure of 160 lb. to the with the power fully applied, it was equal es. What did they see in the great marine One of these was nominally of 1000 horse- was equal to 6000 actual horses. Let e up their minds never to use a man where use a horse, and never to use a horse where use a steam-engine.

FARMERS' CAPITAL.

ought him to the question, "Have we ugh for the purpose?" It could not be t they were going now from the expendi- nall capital to the necessity for a large one ure—a much larger one—and if they had hemselves they must get it from some one ot it. They did that practically in the team-engines, for if they could not afford to on the farm, or if the farm was not large employ one fully, they went to some one apital, and had embarked it in an engine was willing, upon payment of fair interest, em. But he was not a believer in agricul- short of capital. Go into what place he could find a number of quiet comfortable ery large capital invested in everything but . He could point to a case near him, where ectable gentleman told him he could not ut up covered yards and steam-engines, but echi) knew that gentleman had £40,000 ns and mortgages. He would not admit was a want of capital; what was want- the belief in the power they had to capital. They were not in a different the manufacturers, for the history of ctures was that those engaged in them were osed to all the most profitable and interest- ions that were brought to bear upon ufactures. Let them remember how, in the early days of railways, great cities looked upon the railway engine as a horrible thing, and would not have the lines brought near them, and what had been the consequence? Why, they had to make lines at great expense to bring them into communication with the great systems, simply because they would not believe in the advantage of railways in the first instance. Let both landlord and tenant open their minds to this fact, for recollect that agricultural improvement must be done by landlord and tenant for their mutual benefit.

LARGE FIELDS NECESSARY FOR PROFITABLE CULTURE.

One improvement must strike every landlord, as it struck him that day, when he saw a nasty awkward corner of the field they were cultivating interfering with those two engines of Fowler's. A great nuisance existed there, causing loss to the farmer and deterioration in the value of the land, so that the tenant could not afford to pay to the landlord the full value of the farm. A great many years ago he (Mr Mechi) made war upon the pollards of Suffolk—and he believed it had been admitted, although he was a good deal abused at one time, that a good many of these nonsensical pollards had succumbed to their attacks. But they had not half done the work yet, and their enlightened landowners—they were enlightened, but, like the tenants, their prejudices could not be overcome at once—must be convinced on another point. They still retained a love for the rural and forest-like appearance of the country arising from the many hedgerows and small fields, but when they thoroughly understood that these horrible little fields and hedges were the cause of such a loss, both to themselves and to the tenants who invested £800 or £1000 in engines for steam cultivation, they would no longer wish them to exist. Every one would see that if a tenant made a greater profit he could afford to pay a better rent to his landlord, and, practically, that was what would follow improvements.

MONEY VALUE PER ACRE OF PRODUCE.

Were they aware what is the produce of this kingdom per acre? He had had to look out what the produce came to, taking the United Kingdom, and he believed, from the best authorities, our present produce does not exceed £3, 12s. per acre. He would tell them how it was. Half the United Kingdom is in pasture, and a great deal of it is poor, miserable, wretched pasture, which is robbed for the sake of the uplands and other good land. Before our country can take her proper position, before she produces the 365,000,000 eggs a-year that we import from abroad, these worthless grass lands, which, on the average, do not produce more than 40s. a-year, must be made by cultivation to produce, as some of theirs produced, as he had heard that day, 20 tons of good beet, worth £20 an acre. Was it right for them to allow the present state of things, when this land could be made to produce more? Let landlords and tenants lay their heads together and give up old prejudices, and the belief that they were short of capital, when they were not, because they were lending millions to foreigners—something like £300,000,000 sterling—and cease to cry out, "Where is the money to come from?"—that was a little piece of hypocrisy—and when they were convinced, as they were being convinced, that it answered their purpose to take £20 an acre for a good crop of beet-root, let them not spend it all when they had got it, but put a little back in the shape of cake, and a little in corn.

GROWTH OF BEET FOR SUGAR.

This led him to the question, whether it was profitable for them to support this excellent sugar manufactory—the only one existing in the United Kingdom? To arrive at a proper conclusion, he would ask them what would the bullocks pay them for this 20 tons of beet-root, and how much the manure they make was worth? The question was not yet solved, whether it would pay them better to sell the beet to the sugar maker, or to feed bullocks on it. He had heard it said that it takes a ton of beet to make 14 lb. of meat, and, perhaps, 5s. or 6s. worth of manure, and if that calculation were correct, and they could grow 20 tons of beet an acre, it would pay them very handsomely to sell it to the sugar maker.

MR MECHI'S PROFITS.

He had been laughed at a great many times, but he farmed for profit, and he obtained it by draining his land, throwing down fences, having all the land growing something, feeding a large quantity of cake and corn which did not grow on his land. He thus made a profit for both landlord and tenant. Did they believe in his profits? [A voice: No.] He thought not. That was a very honest answer, and he expected some such reply from some quarter, but he was there to speak the truth, and he could only tell them this, that on his farm, which was almost all arable—he had only 14 acres of grass—he found he had £16 an acre capital as tenant, and he found that was not enough, and he could not hold his corn as he would like, but had to sell a good deal of it to buy bullocks. He wanted £20 an acre capital as tenant. If they asked him how it was invested he would tell them. There was £6 an acre in live stock when he took stock, which was at Christmas; his tillages, which were deep, and included all manure, came to £3, 10s. per acre; horses £1 per acre; implements between £2 and £3; and the unsold stock, corn, &c., he had, came to £3 or £4 an acre, which brought up his capital to £16 an acre; but he could make a greater profit if he had £20 or £24 an acre to land all arable, excepting 14 acres. That was a question of pounds, shillings, and pence. Was it better to put £20 on one acre than on two acres with two rents, tithes, and taxes, two seeds, and so on? (A voice: And two crops). They would grow maximum crops as large on one acre as with ordinary farming they would on two, and that was the way he made his profits, and when he told them his profit on 170 acres was something like £612 a-year they would think it was not so very bad, considering that he was an apron string farmer. He could not do it with £10 an acre capital, nor with £12, but he could with £16, and he could do more with £20. He knew many thought £10 an acre was ample, and if they had plenty of poor grass it was, but not if they had all arable land.

MANURE.

The great want, especially if they grew roots to sell off their farm, was more manure, and there was no way, his experience had taught him, of producing that manure so cheaply and of such good quality as by feeding animals under cover on what did not grow on the farm—cake, especially, and corn—that was better than all the artificial manure, except in some peculiar soils where superphosphate was needed. Then, as to the treatment of manure when they had got guano, it would not do to put it down in the farm-yard and let the rains of heaven wash it away—if a man were to do that they would think he was insane or a great fool; but that was just what they did when they allowed that still better guano they made at home to be so washed and turned over and made into muck heaps by the side of the road and rained upon. They were, in so doing, making a fatal economical mistake.

MR MECHI'S MODE OF CROPPING.

They who had seen his crops would know whether the estimate he was going to give them were correct. He got his bailiff to measure his root crops before he came, and he found on each square rod 78 roots averaging 7 lb. each, representing 39½ tons of long red mangolds per acre, and the globe mangolds with the same number of roots to the rod came to 37½ tons an acre. How were such crops produced on poor land which let before he had it at 18s. or 20s. an acre? It was by drainage, deep cultivation, and, above all, by the consumption of 20 tons of cake and corn fed under shelter, taken like hotch-potch pudding, directly from under the animals, and put on to the land and ploughed in like guano. The finish of the rotation on part of his farm was two wheat crops—white wheat followed by rivet. He was asked what he had after wheat, and he replied that he rested it with 40 tons of mangolds. That was his resting crop, and he could not make it except with the quantity of stock he kept, and if he could get it off in time he went in for another wheat crop. Let them have their land clean, and get their landlord to drain it for them, and put up good buildings, paying him a fair interest, and they could increase the food for the people, grown in the kingdom, from £3 to £10 or £12 an acre, and thus retain in the kingdom a large proportion of the £70,000,000 a-year we pay for foreign produce, including tea and articles of that kind.

VALUE OF SEWAGE.

But then came the question, did they put all this food which they consumed on to the land nd thus increase their crops? No, we are ning gradually to that, and the gentlemen in , Norwich, and other large places, are just to believe that thirty millions of sheep being the land if thirty millions of people were o the thirty millions of sheep in manurial we should be in a different position with regard roduction of meat and other food to that we upied. That was a question for the towns, as a question for the agriculturists too. He party who had the grant of all the sewage of ondon for fifty years, but what was the use of gas or coals to people who won't have it? ieved the Corporation of Norwich had taken res of land, and were going to pump their on to it, and they had already been bid £6 an the land on which the sewage would be used. eminent man connected with Liverpool had d him that people were willing to give 25s. r the use of a 2-inch pipe of sewage, and at te they would get a very good return for the vestment in machinery. That enormous stream l that goes into London should come out It can come out again into the country d they were all prepared to say—landlords par- , for it was to their special interest—that when it ght they would pay a fair price for it—such a would leave a satisfactory profit, because none things would be done without a profit. Let lieve him, it was for their interest that landlords as tenants should work together to make agri- ts as free as they could. He could not agree r Hitchcock when he said if Manchester was the land would still prosper. (Mr Hitchcock:) Don't believe it. Your beef, mutton, and uld not fetch the prices they do now if you weep away from England that which employs est number of her children—her manufactures. her manufactures that made her great and , and it is through them that she will retain tness. I hope we shall see town and country or their mutual good, and with no jealousy be- hem—and that buyer and seller may see that necessary for each other's profit, and the good ountry.

THE DISCUSSION.

IDDELL, who acted as vice-chairman, said that hi's statements required a great deal of diges- fore they became assimilated into his (Mr s) agricultural system, but at the same time l to thank Mr Mechi for a great many things. not agree with all Mr Mechi's experiments, hould not be wrong if he said that he agreed y few of them, but as Mr Mechi had become roperty, and possessed such a wonderfully nper, he did not feel any diffidence in making omments upon them. He must think hi, when called to a better world, would leave upon the day in which he lived. Did they know what had been the effect of his crusade against thick sowing? He would tell them. There were about 3,500,000 acres of wheat grown a-year in the country, and he did not exaggerate when he said Mr Mechi had decreased the quantity of seed by half-a-peck per acre, and spread over the whole breadth grown that half-peck per acre became a great saving of food, and a gain to the country of between £100,000 and £200,000. A man who had done that deserved well of his country, to say nothing of his war against pollards, and his advocacy of deep draining. Not that he (Mr Biddell) was altogether one of those who believed in 5 or 6 feet draining, but they were going wrong when Mr Mechi set them right. Mr Mechi was one of the sanguine people who were the leaders of the world. It was they who took steps in advance of the common run of people—sometimes they broke their necks over the obstacles, but without them we should not have advanced as we have. As to the heavy outlay of which Mr Mechi spoke, he could understand that by making a double outlay of £20 an acre, he could largely increase his produce, but the difficulty remained, that they could not get two crops in one year. He had never seen the year when a double crop was obtained to pay for this double outlay of capital.

Mr H. **BIDDELL** had heard Mr Mechi allude to the land he occupied at Tiptree as being poor land. The question he was going to put to Mr Mechi was not in the spirit of opposition, but it was a plain question, which he knew he would answer. He had heard it asserted by gentlemen living in the neighbourhood of Tiptree, whose integrity he could not doubt, and whose veracity it would be folly to question, that a good part of the land Mr Mechi occupies was capable and did produce on an average 4 qrs. of wheat an acre before he took the farm. Now, land that did that could not be very poor land, or we had a vast quantity of very poor land in the best districts of Suffolk. He hoped wherever Mr Mechi went he would be received in the manner which his equal temper entitled him to expect. He had had to meet attacks in which the writers and speakers would have done well to copy the equal temper of the man they attacked, and would have got out of it a little better. He (Mr Biddell) did not disbelieve Mr Mechi's word, but he disbelieved the conclusions at which he arrived, and he was not a believer in the profits of the Tiptree Hall Farm.

Mr **MECHI**, in responding, said, Mr Biddell said he did not believe his statements. That was a point on which he (Mr Mechi) could not argue, but Mr Biddell also said the Tiptree Hall land was not poor land. The other day some of the land adjoining his, of the same quality as his was, unimproved, undrained and with fences like his had when he bought it, was sold for £25 an acre. He had no doubt there were portions of his farm on which 4 quarters an acre had been grown—perhaps 35 acres. In 1842, his land was undrained and full of fences, and he was told that yield of wheat that year was one and a-half quarter an acre. Last year he had 75 acres of wheat which averaged 6 qrs. an acre, and that was some improvement. Having built a very large barn, he was told by all his friends that he should never fill it, and consequently he was rather sparing in his first purchase of rick frames, but bought four, the next year he bought four more, and then added another four, and this year he had his barn and rick frames full and stacks besides. He believed the time was coming when no bullocks would be allowed to range on the land or pastures, but all would be kept under cover, and he advocated folding sheep on the land with iron hurdles, changing them twice a day, and taking the proper mixed food to them, and they would make more meat at a cheaper rate, and manure the land better than by being allowed to range on the old system. Another thing he wished to mention was, that whilst every one around him had the foot-and-mouth disease, none of his bullocks under cover had taken it, and in the same way he escaped the cattle plague.

Papers by Tim Bunker.

II.—TIM BUNKER, ESQ., ON A JOURNEY.— IS VIEWS OF RAILROADS—FARM IMPROVE- ENTS—SAND BARRENS—SWAMPS—SOR- HUM.

R EDITOR,—I do not know but you have thought that my letters to your er have "gin out," seeing that I did not te anything the past two weeks. But fact was, I have been off to see what was g on in the world, outside of my own n. You see there are some people up e that think Hookertown is in the centre he world exactly, and they haven't the t idea but what the whole world turns nd on our axis. In fact, they believe that north pole runs straight through our rch steeple, and what can't be learned in parish is not worth knowing. Ned Bot- , a man of seventy, was never ten miles n home, and never saw a steamboat nor a motive. It was only last night that he bragging about it, as if it was something e proud of. "He had never been caught ne of those man-traps. Not he!"

suppose it is a fact, that a good many ple get hurt on the railroads, but I guess so many in proportion to the travel as injured in the old-fashioned way of horse carriage journeying. I cannot see what vidence has suffered such things to be nted for, unless He designs folks should them to find out what the rest of the ld is made of, and what other people are g. Our minister preached a sermon a le ago about "Many shall run to and fro, knowledge shall be increased," and he ght the day of the fulfilment of this phecy had come. Now I suppose I don't r any too much of sermons, and practise gether too little. But I heard the whole his, and thought I would fulfil my part of prophecy, and started off on the rail, my wife, the same week.

We first went up to Uncle Philip Scranton's, a brother of Sally's, who lives in Farmdale, over east of Hookertown. The whole country, you know, is all cut up into railroads, and has more to the square mile than any other county in the kingdom. It is wonderful to see the influence these railroads have had upon the farms, wherever I have travelled. Almost every farmer lives within sound of the whistle, and has a ready market for all he can raise, at the station or nearest village. Instead of going off to the county town, a day's journey, to sell his cheese, butter, and poultry, an hour's ride in the morning brings him to a market. He loses little time and gets a higher price. This stimulates production, and it is wonderful to see the rocky lands and the swamps that have been brought under cultivation to meet the increased demand for farm crops.

Uncle Philip is a farmer of the old school, but keeps up with the times better than a good many young men. He used to take the old county paper forty years ago, and got a good many ideas from writers who sought to improve farming in those days. You can see where those ideas have been bearing fruit on his farm ever since. He reclaimed a swamp by ditching, bogging, and covering with gravel, thirty years ago, and it bears near 3 tons of hay to the acre now.

He has found that it pays to clear up rocky fields, so rocky that most lazy men get discouraged. He has worked up these rocks into heavy stone walls, with a handsome face, and well capped. He finds these cleared rocky lands just the spot for orchards, and some of the finest trees he has are upon these reclaimed pastures. It is astonishing to see what a sight of work a man can do in a life-time, and what a beautiful homestead he can make of rough barren acres.

He has a nice garden full of fine vegetables, which are now in their glory. Up in one corner there is a lot of beehives, full of music and honey, setting the owner a good example in the way of industry, and rewarding him for his care with a bountiful supply of well-filled comb. All around the wall he has fruit trees and grape vines, which are now loaded with fruit.

I found a lot of Chinese sugar-cane up here, and indeed I have seen it in a number of places. Uncle Philip was trying his for soiling, and found it to work first-rate. He sowed it in drills, and found that it gave excellent fodder, and that the cows would eat it very quickly. He says there is almost no end to the amount of stock a man can summer, if he will only sow sorghum. He thinks he gets a quarter more milk from his cows for this daily fodder. He feeds only at noon, every day. He thinks this is the best time, because the cows have all the morning to eat grass, and then the new kind of food offered at noon induces them to eat more. The more food you can induce a cow to eat and digest, the more milk you will get, and the more profit you will find in keeping her.

This is one of his maxims, and I guess he is right. His stock is a mixture of Devons and Durhams. He averages about 300 lb. of cheese to the cow every year.

Another of Uncle Philip's experiments is reclaiming a sandy patch. He had about 6 acres and nothing would grow on it. It was not worth sixpence an acre. He has put on muck and stable manure in such quantities that it will now yield 40 bushels of corn to the acre. I find he has a great idea of muck, as all the farmers have in this region.

In-doors, Uncle Philip's wife manages things quite as well as he does upon the farm. The butter and cheese are well made, and the house is well kept. I wish the man that told such stories about country cooking could have sat at her table for a week, as we did. The coffee and tea were enough sight better than I ever found anywhere, and the bread, meat, and vegetables, were all that an epicure could desire.—Yours to command,

TIMOTHY BUNKER, ESQ.

XIX.—TIM BUNKER ON FARM ROADS.

MR EDITOR,—I could'nt help thinki
when I was off on my journey, what
awful waste of horse power there was
our farms. On a railway they get rid of
the obstacles, make the path solid, and ha
the running gear as perfect as possible. T
power has very little friction to overcon
and is all spent in drawing the load. On
tram road, they do a good deal to remo
obstacles and make a solid road-bed, b
tram roads and railroads on our farms are o
of the question for doing ordinary farm wo
The next best thing is the common highwa
in which there is some attention paid
drainage, and to the making of a smooth fir
road-bed. This kind of road is within th
reach of all our farmers, and I think will pa
a great deal better than the miserable ca
paths over our farms that most of us are co
tented with. A farmer is just as well able t
make what roads he needs to haul his manu
and crops, as a town is to construct what road
it wants for the common convenience. Road
leading to the fields and that are a good dea
used, ought to be worked every year as muc
as a common highway.

Only to think of the waste of time, of hors
flesh, and of cart-tire, in hauling loads ove
such a road as Uncle Jotham Sparrowgras
has upon his place! It leads down to what h
calls his Lower Place, about a-half mile fro
his house. Though it has been used for fift
years or more, he has never spent a day'
work in mending it. There are rocks in th
rut a foot high or more, and holes where th
wheel goes in up to the nave, in all we
weather. I suppose his team has been drive
over this road two hundred times in a yea
at least, with an average load of not mor
than three-fourths of what they would hav
drawn upon a good gravelled path. In othe
words, if the cost of carting a load over thi
road is a shilling, he has paid £10 a year fo
the privilege of a rough road, to say nothin
of the worrying of the teams, and the breakin
down of the carts, and the swearing at th
ruts. If any of the Hookertown people thin
that the swearing reflects at all upon Uncl

n, they can suppose that the plough- rives the team sometimes, though I say who drives. You see, when the er finds himself with a load stuck fast ee feet of mud, it is rather a trying n for the temper.

w days' labour spent in digging stones uling gravel, would make this road to a turnpike, and then it would not £1 a year to keep it in repair. The would draw a full load instead of three- s, and the labour saved here could be d to other profitable work upon the Now there are thousands of miles of ch miserable roads upon our farms, ught to receive immediate attention. re is any economy in having a good team, there is still more in having a smooth road to work on.—Yours to and, TIMOTHY BUNKER, ESQ.

.—TIM BUNKER ON A NEW MANURE.

EDITOR,—I ha'n't told you any- about my carrot crop, this year, and y I astonished the natives, and myself as much as any of them. It is sel- hat a new idea gets into the heads people up here in Hookertown, but ll declared they got one, when they to see my carrot crop. I guess I had yself, but it was not exactly the same neighbours'.

know, last year I told you about the ling of my garden, and the lots of stuff I put into my cellar, last autumn. vaked up some folks considerable, and Twiggs in particular. One day, last , he come down to our house—pipe in , as usual. Says he, "Squire Bunker, going in for some of them premiums, this year, and I calculate to beat you rots, do your prettiest."

I, "and what are you going to manure

g manure and a subsile plough. You ve got Deacon Smith to subsile my , and I've got manure enough to cover und 1 inch thick, all over. You're done, ne, Squire Bunker, I shall beat you;" and the smoke rolled up in a cloud as he walked off, the picture of self-satisfaction.

Says I to myself, after Seth had gone, "a subsile plough is not the chief end of man. I'll try a few tile drains and a trenching spade."

The lower end of my garden, you know, is bounded by a ditch, and has always been too wet. I got sole tile enough to drain a quarter of an acre, putting them down 3½ feet deep, and thirty feet apart. Thinks I to myself, "if Seth Twiggs gets the start of Tim Bunker on carrots, he'll have to manure with something deeper than subsile ploughs." After the tile were put down, I could see they were needed, because after every rain that came, they would discharge water into the ditch. Seth thought he was doing rather an extravagant thing, sir, putting on the manure an inch thick. It only shewed what a fog his mind was in, about manures. I had a grand compost heap, that I had been making all winter—muck, night-soil, soap-suds, and a lot of bony fish, and very strong. I had it all worked into that quarter of an acre with the trenching spades, full three feet deep. I then raked it all over with a steel-toothed garden rake, the teeth 6 inches long, making a seed bed about as soft as a bed of down. I sowed the carrots in drills, on the first day of June. The drills were 14 inches apart, and I thinned them out to 8 inches in the drill.

When I was digging them, Deacon Smith, Seth Twiggs, and Uncle Jotham Sparrowgrass, came along. The heaps were laying on the ground, about as thick as haycocks, and nearly half as big.

"Quite a crop, Squire Bunker," says the Deacon.

"Did you subsile this year?" inquired Seth, his countenance fallen and woe-begone, as he eyed the carrots lying around, many of them plump 30 inches long.

"Pray, what did you manure with?" inquired Jotham, as his eyes opened with astonishment.

"With brains," said I.

"Brains!" exclaimed Jotham. "I never heerd of that manure afore. Where upon earth could you get enough for a load?"

I could see that the Deacon enjoyed Jotham's innocence, and there was a sly twinkle in Seth's eye, which shewed that the idea was crawling through his wool.

"If you do not believe me, gentlemen, if you will walk down to the lower part of the garden, I'll convince you of the fact."

"There," said I, pointing to the tiles which were then discharging water into the ditch, "I put the brains of ten thousand bony fish on top of that piece of land, and down below, there, you see some of my brains running out."

Uncle Jotham Sparrowgrass got a new idea upon brain manure then, and it is very well disseminated in this neighbourhood now. My own new notion is, that we have a very imperfect idea of the productiveness of the soil, when worked and manured with brains. I measured up 403 bushels of carrots from that quarter of an acre, and I expect to beat it next year.—Yours to command,

TIMOTHY BUNKER, ESQ.

XXI.—TIM BUNKER ON LOSING THE PREMIUM AT THE FAIR.

[WHEREIN SQUIRE B. GIVES SOME BROAD HINTS ABOUT THE WAY PREMIUMS ARE NOT UNFREQUENTLY AWARDED.]

MR EDITOR,—I told you in my last about raising a carrot crop with a new kind of manure. I did not tell you how I lost the premium on the same crop. It is an old saying, that "mirit wins," but I think that must have been said in times when men were less tricky than they are now. I had always thought that the only thing necessary to get a premium was to raise the best crop; but I discovered at our last fair that there was a mighty difference between raising a good crop and getting the premium for it.

You see, our show was held at Hookertown, and the competition in the root crop was pretty sharp. The people of that town were up in force, and I guess, if there was one load of vegetables, there was twenty, heaped up with big cabbage heads, long turnips, beets, parsnips, and carrots. The Rev. Mr Slocum was up, and both his deacons, Fessenden and Foster, and Squire Jenkins; and all brought along lots of garden produce. Smithville was well represented by the Lawsons, the Tabers, and the Wilcoxes.

Now, you see, it so happened that Tom Wilcox kept a livery stable, and had a mare that he thought might take a premium. He fed her high for a month beforehand, and got her into first-rate condition, and brought her on to the ground, without saying a word to the committee, or anybody else, that she had the heaves. My neighbour, Jake Frink, was chairman of the judges on roadsters, and must have known all about Wilcox's mare, as he sold her to him three years ago, and she was unsound then, and only brought £7.

But Jake had an axe to grind, and was mighty anxious to get a premium on carrots, so as to take the wind out of my sail. So he managed to get Tom Wilcox put down among the judges on vegetables. Jake thought the thing might be managed, and sure enough he did manage it. As soon as the judges came on to the ground, Jake—accidentally, of course—met Tom, and says he:

"Mr Wilcox, you are not agoing to enter that old mare, are you? You know unsound horses are not allowed to compete."

"Mr Frink, you don't say so. But look here, Jake, she is as fat as a porpus, and I have fed her on green stuffs so much, that she hasn't coughed for a week. Nobody 'll know anything about it, if you do not tell 'em of it. Ha'n't you got anything you want a premium on? 'One good turn deserves another.' I'm on the committee for garden stuff, you know."

Upon this, you see, Mr Frink took Tom around among the roots, and I had the curiosity to keep within hearing distance.

"Good carrots," said Tom, "but you see yourself, they a'n't so long or smooth as old Bunker's."

"I'll tell you what," said Jake, "I'll double my lot, to make more of a show, and you can give the premium on that."

I did not hear any more; but I saw Jake's hired man unloading a cart about an hour after; and, I guess, if Jake's sample of carrots had half a bushel in it, as the rules required, it had six.

Some of the people opened their eyes, when it was read off at the close of the show:

First Premium on Roadsters, Thomas Wilcox, of Smithville	£5
First Premium on Carrots, Jacob Frink, of Hookertown	£2

But, you see, my eyes had been opened before. The only shadow of a claim these men had for a premium was, that the one had the fattest horse, and the other had the biggest heap of carrots.

At the last meeting of our Farmers' Club, we had up the subject of root crops for discussion. Of course, each man give his experience, and among others, Jake Frink gave the details of his mode of raising carrots, for which he took a premium.

When it came my turn to speak, I took occasion to congratulate my neighbour on his success, but was sorry that he had omitted to give one very essential item in his treatment of the crop, viz., a large application of *horse manure*.

Mr Frink looked very red in the face, and pretty soon had occasion to go out and take the air. Whether he is troubled with apoplexy, I could not say.

Now, Mr Editor, I think it is high time that this business of giving premiums at the shows had an overhauling. If we can't have premiums awarded according to the merits of the case, one very important end of the shows is defeated. People will very soon lose their confidence in them, and will not bring out their products for exhibition. I hope you editors, who know how to write, will stir up your readers on this subject.—Yours to command,

TIMOTHY BUNKER, ESQ.

[All we can say is, that if this is the way premiums are awarded at Hookertown, we should advise Mr Bunker and his friends to have nothing to do with any more shows there.—ED.]

XXII.—TIM BUNKER ON A NEW ENTERPRISE.

MR EDITOR,—I never was more astonished in my life, than this morning, when on my way to the mill down the Shadtown road. I have been thinking a good deal about miracles lately, and I declare they aren't a bit more strange than some things I have lived to see. Jake Frink with a watering trough in his barn-yard is a *poser*, and if you only knew the man as well as I do, you would say so. But that ain't a circumstance to what I am going to tell you now. You see, I hadn't got more than a mile down the Shadtown road, when I saw a lot of men looking over the wall. At first I thought there must be a fight, and that there would be occasion for me to exercise my office as Justice of the Peace. It would be almost a miracle if there should be such a thing in Hookertown, for we are an uncommonly peaceable community.

As I drove up, I saw Uncle Jotham Sparrowgrass, with a team and three hands, busy digging a ditch, and about a dozen Hookertown people looking on. There was Deacon Smith and Seth Twiggs, Jake Frink, Tucker, Dawson, Tinker, and Jones, and among the rest, the minister, Mr Spooner. It seems Uncle Jotham had begun the job the day before, and the thing had made such a sensation, that a pretty strong delegation was out to see Jotham Sparrowgrass to work on an improvement.

There never was a prettier chance in the world to do a nice thing for a bit of land. You see, he had a peat swamp of about 3 acres, lying in a hollow, mostly cleared of brush, and with a small pond-hole in the middle. The peat in some places was 10 feet thick, and all the edge of the bog was wet and springy for at least 2 acres more. The whole was worthless as it lay, except for the muck which it afforded, of which Uncle Jotham never used a cart-load in his life. The bog lay high, and by digging about 10 rods, through the rim of the hollow, there was fall enough to drain the whole swamp, 3 feet deep or more. Here Uncle Jotham was at work with his men, like so many beavers.

The main drain had been cut, and one could see how these peat bogs had been formed. After the stones and surface earth had been removed, it was a solid light-coloured clay, which would hold water tight as a basin. Everything that run into that hollow, and everything that grew, had to stay there. All the wood, brush, and mosses, that flourished there before the country was settled, had decayed, and made a vast bed of vegetable mould. The water, having no chance to get out, had operated as a great millstone to press it together very solid. It had now found an outlet and was making a straight race toward the North Star, as if seeking liberty for the first time.

"You are just in time, Squire Bunker," said Deacon Smith.

"You have got another convert here," said the minister.

"Who would have tho't it?" exclaimed Seth Twiggs, as he took the pipe out of his mouth, and blew out a cloud of smoke, that made one think of a locomotive.

"Old Bunker will make fools of us all," soliloquised Jake Frink, as he thought of the horse-pond and the lead pipe leading to his barn.

"Good morning, Uncle Jotham," said I. "I thought you didn't believe in doing anything with swamps, eh? What are you doing here?"

"Why, you see, Mr Bunker, I've known this 'ere swamp for risin of thirty years, and have raised corn near it for about the same length of time; and I never had a piece of corn anywhere in this neighbourhood that wa'n't badly eat with the rats. You see the scoundrels begin to work upon it early in July, and they keep at it until frost comes. I've sot traps for 'em, and shot 'em, and done every thing I could think of to kill 'em off, and I believe they are thicker than ever this spring. So you see, I was riding by your house last week, and seed where that horse-pond used to be, and I got to thinking, and this 'ere plan came to me, all at once, like a flash of lightning. Thinks I to myself, I've got them pesky animals in a tight place at last. I'll dry 'em up, and put 'em on a total abstinence principle, be hanged if I don't. You can't have a drunkard without bitters, nor a rat without water, can you? And you see, with one day's work I've took the water down to the bottom of the pond, and I a bound to go 3 feet deeper, by the measu Whether I make anything out of this bog not, I'm bound to rid the rest of my farm a great enemy."

It was a grand sight, Mr Editor, you ma depend upon it. I don't know as I bear an particular ill-will to the tadpoles and eels, bu somehow I kind o' like to see their confusio when the water slopes off on a sudden, an they flop around in the mud, not knowin which way to emigrate. They lay there b the bushel, evidently very much troubled a the daylight. I would go farther to see suc a sight, than to see all the menageries eve exhibited. I have heard them tell about th fine points in a painting, the contrast o colours, &c. There is no contrast quite s satisfactory to my mind as this light-coloure clay on *top* of a black muck soil. I a always certain of dark green to shade it prett early in the season.

You see, full one-half of Uncle Jotham' talk about the rats is gammon. He don' like to own that he has learned anything fro me or any of his neighbours. But, you see, h has already made up his mind to plant that bo with potatoes this season, and substitut tubers for tadpoles and eels. The fact is, M Editor, that horse-pond movement has don the business for quite a number of my neigh bours, and is working better than physic There are at least four of them started on new tract by that enterprise. Now, if yo have the least spark of patriotism, come u and see us. If you expect to see anything the Hookertown of the present generatio you must come quick, for I tell you now, thi world moves, and no mistake. If you don' come and see what's going on, we shall ge up a rebellion, we shall—do anything bu stop your paper. That we are bound to hav whether you come or not.—Yours to comman

TIMOTHY BUNKER, ESQ.

[It is put down in our note-book to visi Hookertown next week—*if we can*—ED.

Our Library Table.

of the Commissioners of the New York State
ricultural Society for the Investigation of
ortion in Cows. Published by the Society.

RTION in cows is so prevalent in some of
he eastern States of the American Union, as to
equired the appointment of a Commission
hly to investigate the subject. It was sup-
y many that one source of the disease was the
us fungi, especially *ergot*, which were to be
n the grasses of particular districts; but from
estigations made, botanically and microscopi-
he Commissioners could not trace the disease
appreciable extent to this cause. Their atten-
s directed also to the class and age of bulls
nd here, too, they failed to discover the cause
revalent a disease. They were able, however,
quiries, made over a large dairy district, to
hat one undoubted cause of the losses was the
of breeding from stock at too early an age,
exacting from the dam, even during gestation,
essive amount of milk. These practices pre-
to a very large extent, and were found
ly to account for the disease in question, but
deteriorate greatly the whole character of
g stock.

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nd Difficulty of Ireland, with an Attempt to
ve it. By GERALD FITZGIBBON, Esq., Master
Chancery. London: Longman & Co.

WITHSTANDING the violent partisan,
anti-ministerial character of this brochure, it is
ble contribution towards the solution of the
roblem of the day, and will, doubtless, mate-
d the Government in preparing their promised

men have had better opportunities of witness-
evils arising from the present position and
of landlord and tenant in Ireland than
gibbon. In his official capacity as a Master in
ry, he has had to deal with no fewer than 400
occupied by nearly 20,000 tenants, and has,
e, an experience of the practical working of the
stem in Ireland, which entitles him to speak
mething like authority, when he submits a
which he considers will go far to remedy the
loudly complained of.

e midst of the controversy now being waged on
bject, and the crude remedies that are so
ropounded in the press, it is refreshing to meet
plan such as Mr Fitzgibbon presents, at once
n and practical, and which strikes one's
n sense as so feasible; urged too, with all the
an experienced, cultivated mind, and with the
ardour of an Irish patriot.

The corroding social disease of Ireland, he considers, from which all others radiate, is the mutual distrust of landlord and tenant. This grievance existed in England itself more than two hundred years ago; but English landlords were wiser in their day than Irish landlords appear to be now, for, without any legislative remedy being applied, the landlords became sensible of the mischief, and found a cure for it. So deep-rooted, however, has become the mistrust of Irish tenants, that no remedy suggested by their landlords would be received with favour unless confirmed by Act of Parliament.

The principles on which Mr Fitzgibbon's solution of the land difficulty rests are, that property in land is charged with a duty to the State; that this duty follows the land, and is inseparable from it; that reasonable attention to the cultivation of the soil is involved in this duty, and that extensive neglect of cultivation produces disorder which justifies legislative interference, and demands a remedy co-extensive with the mischief, and corrective of the default from which that mischief arises.

From these principles he proceeds to argue that if the landlord obstructs the reclamation and improvement of the land, on the products of which the lives of the people depend, he may, under certain conditions, be compulsorily required to give facilities to those who will promote these ends; that if the landlord cannot or will not take steps to increase the productiveness of his land, the tenants should receive every encouragement to do so, the rights of both being carefully protected.

He gives in detail a very simple and inexpensive method by which this could be accomplished, by which a longer or shorter tenure could be secured to the tenant according to the nature and extent of the improvements he would guarantee to make within a certain period; which would meet the Irish love for property in land, by encouraging the people to habits of industry. No Act of Parliament would call forth these habits; but once let the people clearly understand that the tenure of their property depends upon the skill and industry they exhibit in improving their farms, and that their holdings are secure to them so long as they cultivate them to the best advantage, and an extraordinary revolution will be effected in the Irish people.

One great obstacle to this improvement is in the character and habits of the people themselves, especially the older generation. Their love of ease and unwillingness to work, their filthy habits of life, and their utter want of taste for comfort, will operate powerfully against any plan being fully carried out. It is to the younger generation Mr Fitzgibbon looks to be the true regenerators of Ireland; and if by his plan or any improvement upon it, this can be effected in one or two generations, it will be a matter of boundless satisfaction to the whole empire.

Mr Fitzgibbon's pamphlet will well repay perusal and careful study to all who are interested in the Irish land question.

Notes and Queries.

WHEAT AVERAGES.

THE following return, pursuant to an order of the House of Lords, has been ordered to be printed.

Return shewing the average annual price of wheat for each of the twenty-one years from 1826 to 1846, both inclusive; and also for twenty-one years from 1847 to 1867, both inclusive; and the maximum and minimum prices distinctively in each of those series of years, together with the average price on the whole of each series:—

	Per qr.			Per qr.	
	s.	d.		s.	d.
1826	58	8	1847	69	9
1827	56	9	1848	50	6
1828	60	5	1849	44	8
1829	66	3	1850	40	3
1830	64	3	1851	38	6
1831	66	4	1852	40	9
1832	55	8	1853	53	3
1833	52	11	1854	72	5
1834	46	2	1855	74	8
1835	39	4	1856	69	2
1836	48	6	1857	56	4
1837	55	10	1858	44	2
1838	64	7	1859	43	9
1839	70	8	1860	53	3
1840	66	4	1861	55	4
1841	64	4	1862	55	5
1842	57	3	1863	44	9
1843	50	1	1864	40	2
1844	51	3	1865	41	10
1845	50	10	1866	49	11
1846	54	8	1867	64	5
Average of the twenty-one years	57	4	Average of the twenty-one years	52	6
Maximum price....	70	8	Maximum price....	74	8
Minimum price....	39	4	Minimum price....	38	6

A. W. FONBLANQUE,
Comptroller of Corn Returns.

109. KEEPING HAMS.

Will you or some of your correspondents tell me how long a ham can be kept after it is boiled and baked? I have tried half frying, packing close in a jar, and covering with the lard fried out. I have no cool, dry store-room here.—*F. J. S.*—[After drying the hams thoroughly, the best plan as yet proposed is to wrap them up in paper bags, and hang them up in the garret, or an outhouse; they a perfectly free from smoke, and look deliciously clea and sweet, although they have been kept in that con dition for some time. It is generally preferable t keep hams and bacon in paper bags than in bags c cotton, as it is impossible for flies and other insects t attack them through the paper, and the atmospher cannot have free play, as it does through the cotton Some people keep hams in a bin of malt or barley Of course that would not be practical with many, a all are not fortunate enough to have a bin of barley but I should think they would be very nice if kept i dry bran, oats, or wheat. I think broiled ham i much nicer if the slices are cut very thin. When ham is very salt, a little soaking will improve it; but if i has been properly salted, this will not be necessary.

110. RABBITS AND FRUIT TREES.

I can give your readers the benefit of my experience in the protection of fruit trees from the attacks o rabbits, in the use of an article much easier to come at, and which can be had in every family. I rub my young trees from the ground up as high as a rabbit can reach, with rancid bacon rind or skin, with perfect success; not one of them have been touched by a rabbit since. One rubbing, early in the spring, is sufficient for that year.—*G. W.*

111. SURE REMEDY FOR KICKING COWS.

Take a 5-8ths inch rope, 4 or 5 feet long; tie a knot near one end in a way to leave a loop about 2 inches in diameter—not a slip-noose. About 2½ or 3 feet from it, tie a plain knot. Now put this rope on the cow just above the gambrel joints, so that i will be in the shape of a figure 8—that is, around both legs and crossed between them, with the knot jus drawn through the loop. The cow cannot kick o hurt herself, and is safe to milk soon.—*E. S.*

112. FOOT-ROT IN SHEEP.

I have always found a small quantity of muriati acid applied to the feet of those of my sheep which ar diseased, to be one of the most effectual remedies have ever tried. One or two applications is all that i necessary. I have applied to my cattle what is termed cow-itch, and always with success.—*F. W.*

The Garden.

ARUNDO CONSPICUA FORSTER.

HIS, the Toe-toe or tohi-tohi of the Maories, according to Dr Hooker, und throughout the northern and middle ds of New Zealand; and is not only largest and most useful grass, but the t elegant hardy member of the "Flora æ Zelandiæs," which has yet been intro- d. And although it may hereafter be led to a prominent place among the grasses of Britain, it is chiefly as an mental plant that we here recommend it. lthough named by Reinwold and George ster, father and son, who were the natura- in Captain Cook's second voyage to New and in 1772, and a most happy selection name they certainly made for it, its duction to our gardens is, as it were, but esterday. For although its splendid ch-feathered like panicles, from 1 to 2 feet ength, were often brought home among r New Zealand curiosities, its seeds were er incapable of vegetating, after their sea voyage, or being only those of a osed tender grass, little skilful attention bestowed upon them. When at last duced, we are unaware, whether that effected through seeds or living plants ost likely the latter; for we, too, had our share of disappointments imported seed, even when brought e by the agency of steam, and ough packed in various recommended s. Many who have not yet seen the Toi- rass in its full grown conspicuous elegance be familiar with the now generally culti- d Pampas Grass—Gynerium argentium— hich it bears a considerable resemblance, wing up like it noble culms or stems, ding under their whitish, feathery plumes, immense tussocks of long and strong gracefully arching sub-evergreen foliage; but differing from it by producing these stems and panicles in July, and carrying them unimpaired in beauty throughout the autumn months, instead of their shooting up so late in the season, that before being fully expanded, they not unfrequently get nipped and disfigured by the early frosts.

Like other species of Arundo, or reed-grasses, the Toi-toi, in its native habitats, grows in marshy or swampy places, where it attains to heights of from 9 to 12 feet. While under home cultivation it succeeds perfectly in ordinary garden soils, it having, at three different places in the vicinity of Edinburgh, attained to the following dimensions on well-drained ground in the past remarkably dry summer and early autumn, viz., in the grass collection of the Royal Botanic Gardens. A plant, having a considerable number of stems, measured 11 feet 3 inches in height; another, in the gardens of I. Anderson Henry, Esq., at Hay Lodge, had fourteen stems, the tallest of which was 9½ feet; and the third, in Mr P. S. Robertson's nursery at Trinity, had no less than 140 stems, averaging 8 feet. This last is one of the first plants brought to Scotland, and had to be transplanted last spring in consequence of growing too near to one of the nursery roads, where the cart-horses rarely missed having a mouthful of it in passing; and but for this transplanting it might even have rivaled the first in height. The leaves are from ½ inch to about 1 inch in width, tapering gradually to their points, remarkably strong, and harsh to the touch, in consequence of being furnished with minute saw-like teeth along their margins and on their principal veins or ribs. In length, the leaves are generally from a-half to three-fourths that of the stems, or about a-third longer than the height of the fore-mentioned gracefully arching leafy tussocks.

In addition to being highly ornamental, the size and habit of growth renders this grass one of the best plants for employing as cover in game preserves; seeing that all kinds of game, up to the size of young deer can lie concealed under its ample foliage; while wild fowl of many kinds, and all sizes, will find agreeable and safe nesting, and resting places, in the centres of its broad-spreading tussocks. To its extensive employment, however, whither for these or other purposes, its scarcity, and consequent high price, have hitherto been effectual barriers, not likely to be speedily overcome, so long as its propagation is restricted to root division, as has generally been the case hitherto, from a mistaken notion that it was incapable of perfecting its seeds in our climate. These are almost microscopically small, and are still less distinguishable, in consequence of being hidden among comparatively large, chaffy, and hairy coverings; but wherever full grown panicles appear, there, also, are perfect seeds to be found in almost infinite numbers, which have only to be collected and sown, in order to produce plants in any required quantities. It has not yet been ascertained how long these seeds will retain their vitality in our climate; and, perhaps, the safest plan is to sow them when gathered, so that they may either vegetate in autumn or lie over, preserved in nature's earth-protecting covering till spring. A pot which we had sown with scarcely ripened seeds, in the middle of September last, brairded thickly in less than ten days, and seeds which were early scattered around the old plants sprouted after a like interval; while others more fully matured, which were sown in the middle of October, both in a cold frame and in the open border, have not yet vegetated, although they will in all likelihood do so under the stimulating effects of spring warmth. And when it is generally known that its feathery panicles are composed not merely of chaff and barren florets, but that they are richly stored with perfect seeds, the Arundo conspicua will, doubtless, soon become a really conspicuous object, not only in our gardens, ornamental grounds, and game covers, but also in our fields and meadows.

For the information of such as may feel interested in knowing the economical uses to which the Toi-toi grass is applied by both the natives and colonists of New Zealand, we append the following particulars:—As a pasture grass, it is, when young, greedily devoured by cattle, sheep, and horses. In dry seasons, when other natural grasses fail, live stock betake themselves to the marshes where it abounds, and fatten upon it; hence, a portion of swampy ground is deemed an almost essential adjunct to a good stock station. While, at all periods of its growth, its roots, as well as the low blanched tender parts of the tussock, are keenly sought after and eaten by swine. The leaves, when full grown, form excellent, neat, light, and durable thatch, their rough, serrated edges making them adhere to one another; a peculiarity that, in combination with their great length, renders few fastenings necessary. The long, smooth, and slender, but firm stems or reeds, when stripped of their leaves, form a still more lasting as well as ornamental roofing; and they are also used by the natives for lining their dwellings, to which they impart neatness as well as elegance, being fastened to the wall surfaces close together, either perpendicularly or in fanciful figures. And the feathery panicles, but especially the hairy seeds, form excellent substitutes for feathers in stuffing beds, pillows, and cushions. These hairs are numerous, long, and elastic; appearing, under a powerful microscope, quite smooth and hollow, which smoothness, combined with their elasticity, prevents them from matting or adhering together.

*THE MARKET GARDENS OF PARIS.**

addition to the abundant watering and
ich manuring, the Parisian market gar-
owe a great deal of their success to a
ystem of rotation, eight crops per year
frequently gathered from the ground.
.t not so the cultivators could not exist,
/ limited is the ground each possesses.
siderable portion of the surface in one
I visited was devoted to Cos lettuce,
ery fine specimens of it; but beneath
here was a dark green carpet of leaves
ose to the ground—the leaves of the
e, which forms such an excellent salad,
indeed one of the very best of all
and not yet sufficiently grown in Eng-
The young plants have plenty of room
v now amongst the closely-tied up Cos
; but the moment the Cos is cut for
, the Scarolle has full liberty, and with
ınce of water soon makes wide heads.
perhaps, some young plants of another
ble are slipped in at regular intervals
angles between four plants of Scarolle,
crop will be vigorous and half-way to-
erfection when the great smooth Endive
y for the market. As an illustration of
pping, the cultivator described to me
a portion of his ground for the past
In the earliest spring the ground was
ed by Cos lettuce, and from between
crop of Radishes was gathered. Cauli-
were planted early among the Cos,
they approached maturity, the ground
course wholly occupied by them, as
uld not well put anything beneath a
f perfectly grown Cauliflowers. When
ere cut in May and June, an opportu-
ccurred of giving the ground that
gh culture and preparation which such
se of heavy cropping demands. Then
of Spinach was sown, and in the
h Cos lettuce. As soon as the Spinach
eared off, a crop of Endive was placed
alternately with the Cos. Then small Cauliflower plants were put in, yielding a fine crop in the autumn, and after them a small quick crop like Corn salad, and afterwards the ground was covered with frames.

Like everything else in Paris, and in France generally, the condition of these market gardeners has much improved during the past generation. Their houses are humble enough now, but I am told by M. Courtois Gérard, a capital authority on the subject, that they are palaces compared to what he remembers them to have been. Some of the crops, and particularly the forced crops, are now brought to invariable perfection in low narrow wooden frames. Eighty or ninety years ago, however, the market gardening of Paris was much less perfect; fewer crops were gathered during the year, the art of forcing early vegetables and salads was in its infancy, and the most advanced market gardeners had not gone beyond the use of the cloche to force their vegetables. It is not that frames were not known at the time, as they were known in royal and other private places, but they had not entered the market garden. In 1780, a cultivator named Fournier first used frames; and with such success in forcing, that a great number of his fellows soon imitated him. It was the same individual who first introduced the culture of the Cantaloupe Melon, and he also first grew the Spanish or Sweet Potato. The first who forced white Asparagus was one Quentien, about the year 1792; the green Asparagus was also first forced by the same about 1800. One Basnard first forced the Cauliflower about the year 1811. She first forced Cos lettuces appeared about 1812, and the Endive about the same time by Baptiste Quentien. The Carrot was first forced in 1826 by M. Gros.

The workmen employed in these market gardens, work, like their masters, very hard but are pretty well paid. From inquiries made from different cultivators, the wages are

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luded from page 366

from fifty to seventy-five francs per month with board and lodging. They have no fixed hours for work as with us, but in summer begin with the dawn and in winter hours before it. They often commence work at three in the morning, and continue it till eight in the evening in summer. In the dark winter mornings they cannot of course work in the gardens, but they can take the produce to market and go for the ever necessary manure. After a visit to one of these places I was invited by the proprietor to take a glass of wine with him. Hardly were we seated to this before he spoke some words from the door, and presently in came his two workmen, sunburnt, strong men, working barefooted in the soft moist soil of the garden, and they also had their glass of Bordeaux, touched our glasses, and again went out to work. I afterwards learnt that this was the rule with them—anything the master has the workmen partake of. Under these circumstances the gulf of distrust, and, consequently, other evils that exist where the workman is treated as a far inferior being, cannot be. M. Courtois Gérard says, that to cultivate a garden of two and a-half acres devoted to forcing in frames, and open air culture, it is necessary to have five or six persons—that is to say, the master and mistress, two men, a girl, and a boy.

As to the masters, I was informed that many of them could not read or write; but noticed, notwithstanding, a good barometer in each house. They well know the value of this instrument, and I was told by one of the very best of them that it was of the greatest use to him in his cultivation, by helping him to take precautionary measures and adapt his labour to the weather. This individual had worked fourteen years at the business, and was desirous of disposing of his garden, feeling rich enough to retire and live on the fruits of his labour. These men have their vicissitudes, notwithstanding the vigorous industry and excellent system of culture which is general with them. Some that I visited devote a considerable portion of space to a difficult crop—cauliflower seed. This takes a long time—more than a year—to bring to perfection; one market gardener who had been in the habit of growing large and precious quantities of it for Messrs Vilmorin, Andrieux, & Co., had scarcely gathered two pounds of it in consequence of the great heat of the season of 1868.

There is a "Société de Sécours Mutuel" among these market gardeners. To give an example of the way they work, I have merely to state that when a body of provincial cultivators were almost ruined by inundations, the Paris Society sent them more than 1200 lb. weight of seeds to begin again with. Generally they seem independent, and are said to accumulate money; but their houses do not shew the comfort that one could desire. However, few will doubt that it is better to have a large class of small proprietors in a thrifty and independent, if very humble condition, than one individual with his hundreds of acres, and every soul employed by him without a single thing in the world to call his own, except it be misery, poverty, and degradation. The Paris market gardener is very far from being mistaken for a "genteel" person, or putting in the small claim to the

> "Grand old name of gentleman,
> Defamed by every charlatan,
> And soiled by all ignoble use;"

but he is a thousand degrees better than the poor wretch working in a London market garden, who is practically a slave, and a very wretched, badly-fed, badly-housed, and badly-clad slave too.

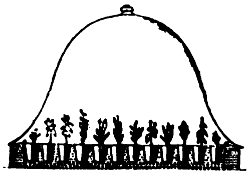
The cultivation of the mushroom is of vast importance about Paris; and I will next deal with the doings of the Champignonnistes, a class of men who devote themselves entirely to its culture.

THE PUBLIC NURSERIES OF PARIS.*

propagating which seemed most ccessful is carried out on a different ırs. No pans are used in this house, small pots, a shade larger than a in each a cutting is placed, the little placed in the tan, and covered with ılar bell-glasses, as shewn by fig. 2. ter part of the house is occupied :, all being of the same size. But some special arrangements for pro- the more difficult subjects, and

g Pot used in the Jardin Fleuriste: full size.

em may be noticed what appeared ıprovement—the bell-glasses, which vhat of the ordinary shape, being vith an aperture at the top of about ; in diameter, into which a piece of squeezed to absorb the moisture inside. Nothing could be more ke than the arrangements for pro- ı this house. We will next glance



nall cutting-pots under bell-glass.

f the more remarkable collections ıres.

: yourself prepared to visit a propa- ıblishment, and then finding your- ed into a grand conservatory of Camellias—a second being in connexion with it filled with Aralias, Yuccas, Beaucarneas, tree ferns, Nicotianas, Dasylirions, Dracænas, and a host of such plants, all in fine condition and well arranged; and another, on the other side, containing healthy palms in vast numbers. These are arranged in three longitudinal beds, while all along the sides of the house is a belt of the smaller and younger kinds, plunged in tan to give them a little encouragement. To look along the pathway between these long beds, is like glancing into a fresh young tropical palm grove, in such perfect health are the plants. When it is considered that many other great houses are in the garden, besides a large field of pits and frames, the reader will agree that it would be out of the question to examine each subject, particularly when it is stated that there are nearly 400 kinds of palms alone in this establishment. Though it is essentially a business garden, and one in which an almost innumerable host of plants have to be annually developed, no slovenliness of arrangement or culture is apparent in any part.

Seldom, indeed, do we see such efficient economy of space in gardens as is the rule in these houses. Under the benches are packed quantities of Caladiums, Fuchsias, Cannas, and other plants that may be efficiently preserved in such places in winter; and even after the great Arums, &c., are potted off in spring, they are placed underneath for a short time, every available inch being taken advantage of. Some of the houses are large lean-to's, and instead of the back wall being left naked, or with one shelf placed against it at the top, there is a series of shelves one above another, six altogether, and on these a multitude of plants are accommodated—Coleuses, &c., in the warm houses; Lantanas, and the like, in the cool. They keep well on these during the winter, and, if drawn a little or discoloured, the mischief is soon counteracted by a sojourn of a few weeks in the frames in spring. In the large span-roofed curvilinear

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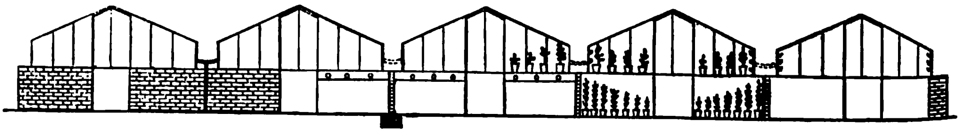
· Robinson's admirable work, "The Parks, and Gardens of Paris."

houses, with a narrow passage through the centre, there is a series of shelves affixed to irons on each side of the central pathway, and on these great numbers of plants are stored, so that every space is taken advantage of without in the slightest degree interfering with the health of the plants, which is truly admirable. But doubtless it is necessary thus to economise space, for the enormous number of nearly three million of plants is annually furnished by this establishment for the embellishment of Paris and its environs. They are raised at a very cheap rate—less than a penny each. It should be observed that many of the plants are such as would be fit to embellish any exhibition, numbers of them being palms and fine-leaved plants, while of course the least valuable are simply bedding plants, from Nierembergias to Pelargoniums, of which last 400,000 plants are sent out annually.

If neither houses nor plants were seen, the potting-shed would tell of extraordinary operations, for in the centre there is a great wide bench, around which sixty men can work. Ordinary bedding plants are kept here in an unusally economical manner. A large space of ground is covered by parallel lines of rough and rather shallow small wooden frames, simply and cheaply made—in fact, such as the rudest workmen could put together during wet weather. The frames are rather closely placed; and the pathways between, and indeed all the spaces around them, are filled up with leaves and mossy rakings from the adjacent Bois de Boulogne. These are nearly or quite piled up to the edge of the frames, and of course keep the plants warm through the winter. In winter the floor of the frames is low; in spring, by putting in a quantity of the well consolidated leafy stuff before named, it is raised so as to bring the foliage of the plants right up to the glass. All the material is removed from between the frames in summer. Many of these frames are furnished with iron sashes, so that only the rough cheap framework is exposed to the decaying influences of the weather. The large quantity of leaves and moss thus decomposed is preserved for potting purposes, making of course excellent leaf-mould.

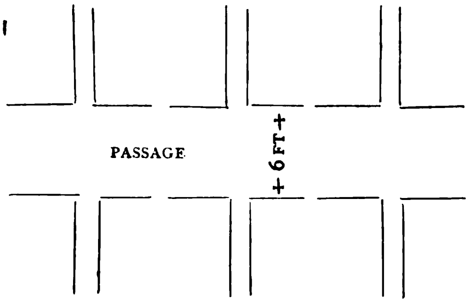
A number of houses that have lately been erected at La Muette materially encroach upon the space occupied by the rough framing just alluded to, which they are destined eventually to replace. These houses are especially intended for bedding plants, and are so well adapted for that end that some details about them may be useful. They have been designed on an excellent plan for the culture of such plants, the raising of seedlings, and for the growth of seedling palms, and all dwarf and young plants. I have seen a good many houses devoted to similar purposes in public, private, or commercial gardens in all parts of these islands, but never any so well-arranged as those in the Jardin Fleuriste. They are low, and rather narrow, so that all operations may be conducted from the central pathway. The sashes are cheaply made of thin iron, and the roof consists of one sash at each side. Many of the iron sashes of the old frames were utilized in the building of the houses.


End view of new range of bedding-plant houses in the Jardin Fleuriste.

As you pass along by the ends of these plant houses you may see a bench about a hundred feet long, filled completely with the deeply dyed Alternantheras—a sheet of colour; the next devoted to young palms, as green and vigorous as if in their native wilds; another devoted to young Dracænas and fine-leaved plants generally; and so on. The benches are of slate, and the plants are held well up to the glass, while quantities of subjects in the way of Cannas and Dahlias may be stored beneath, as shewn in the engraving. We generally prefer wooden houses, but any

orticulturist who has seen the plants in this
w range at Passy will agree with me that
o plants could be in finer health or condi-
ion; while the very permanent nature of the
tructure is a great gain, inasmuch as a
ooden series of the same character would
quire a complete overhaul in the course of
dozen, and perhaps reconstruction at the
nd of twenty years.

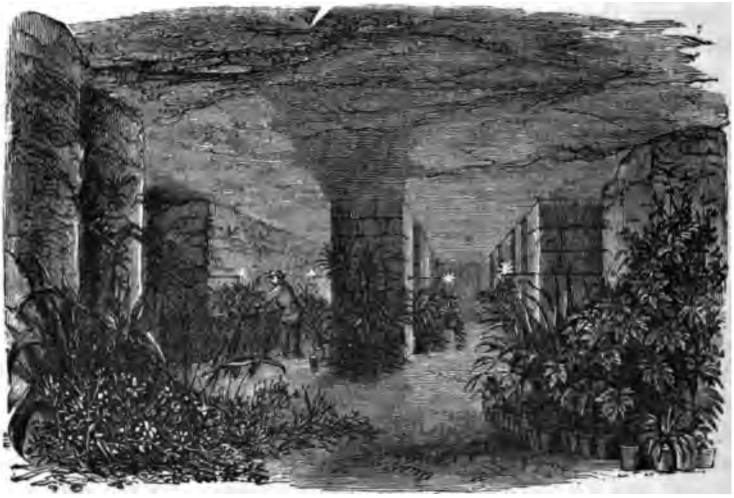
A mode of protecting these houses from
ost by means of wooden shutters, each
out the size of the sash of the house, is
serving of notice. As will be seen by the
graving, the gutters, strongly lined with
nc, are wide, so that men can run along
em with the greatest ease to protect or
ade the houses. The shutters are not
ken from between the houses every day,
it simply left in piles of ten or so over some
occupied spot, or if the range happens to
completely filled, each pile is shifted every
y so as to prevent the plants beneath from
ffering. The facility and simplicity with
ich these houses may, in a few minutes,
thus encased in wood to meet a very
ere frost, and without the least untidiness
any kind, are admirable. However, mat-
s are so arranged in the houses that they
uld dispense entirely with this precaution,
ich is noticed merely from its adaptability
many places where a great number of bed-
g plants have to be kept, and where the
ans of heating sufficiently to keep out very
ere frosts are not forthcoming. The
und plan of the range is nearly the same
that already described, so that the men at
rk in any of the eighteen houses of the
ck already completed, may pass and con-
plants from one to the other without
sing through the open air. Thus the
nfort of the men and the health of the
nt are both secured. Already nine houses
arranged on each side of the central pas-
e, and it is proposed to continue the
angement till all the ground previously
oted to framing is covered with this class
ouse. The visitor, entering at the outer
and continuing his way through any of
houses, would at its farther end meet
h the covered way running at right angles to it, through which he could enter any of the other houses he wished to see without again exposing himself or opening any doors to chill the plants in winter, or running the draughty gauntlet, as he usually has to do where houses are arranged in the ordinary scattered way. Moreover, as in many cases, one long house is devoted to a particular species or variety in much request, the visitor or superintendents may see the state of the stock by simply traversing the central passage, and looking through the glass dividing it from the houses.



Portion of ground plan of the bedding-plant houses in the Jardin Fleuriste.

But though the ordinary dwarf bedding plants are preserved in vast quantities both in the rough frames and · the houses, these are not the cheapest ways in which they manage such things here, as we shall presently see. Many have heard of the graceful use made of the Cannas in Parisian gardening. These are preserved in a most efficient way in caves under the garden. When the stone is taken out of the ground for building purposes, a rough propping column is left here and there, and thus dark and spacious caves of equable temperature are left underground. They are in this case about 7 feet high, and are used for storing plants that may be well preserved without light in the winter. You descend by a sloping tan-covered passage, and most likely you will imagine yourself in a large potato store immediately you get down, as heaps of different kinds of Canna, and those that are by no means common with us, are in winter spread upon the floor a yard or more deep, and twenty feet long. The tubers of some of the large varieties are from five to ten inches long, and the men turn them over just as they would the contents of a series of potato-pits.

Here, too, in wide masses against the wall are arrayed quantities of Aralia papyrifera, the handsome and much grown species so useful for subtropical gardening. It seems in a perfectly firm and safe condition, growing in this dark or rather gas-lighted atmosphere, and sends out long blanched leaves of a delicate lemon colour, which will of course soon acquire a healthy green when the plants are placed in the open air. Thus they preserve Aralia papyrifera in all sizes, and this fine thing is turned out for garden embellishments almost as cheap as wall-flowers. Of course analogous protection could be given to such things in many English gardens where space may be limited, and much expense out of the question. In these caves were also preserved Brugmansias, American and other Agaves, Dahlias, Fuchsias, &c., and it seemed to be about the best possible place for storing such plants.



Caves under the Jardin Fleuriste, used for storing large quantities of tender plants in winter.

The quantities in which you see rare things and new bedding plants here are surprising. Houses, eighty and a hundred feet long, are filled with one variety; and others of equal size are devoted to the raising of seedling palms, &c., in large quantities. If a plant be considered worthy of attention at all it is propagated by the thousand; 30,000 being the opening quantity for a new thing of any promise. During the past autumn 50,000 cuttings of one kind of Fuchsia were inserted in one week. Dracænas are grown here more abundantly than variegated Pelargoniums in many a large English bedding garden, and the Jardin Fleuriste is believed to possess the finest collection of them in existence. In one house a specimen of each kind has been recently planted out for trial in the central pit, and among them are many handsome kinds worthy of extensive use with us.

It is a favourite plan here to devote a house to a special subject. Thus there is a large and fine span-roofed stove for Ficuses a house for the collection of Bananas, with line of thirty healthy plants of Musa Enset forming its backbone, so to speak; a ver large and high curvilinear stove for the gre collection of Solanums; special houses fo Arums, Caladiums, &c.; and a winter garde about 120 feet long by 40 wide, well store with a healthy stock of the usual conserva tory plants, with here and there fine-leave things like Phormium tenax, a very effectiv plant when well grown in pots and tubs, an of which they have here thousands of plant of various sizes. Of course all this vast co tion cannot be and is not used for summer :oration. It is employed for the decora- n of the Hotel de Ville, where 10,000 nts are sometimes required upon a single :asion. The boilers of some of the smaller uses are heated by gas, and in this way a y equable temperature is preserved.

It may give some approximate idea of the lection, when it is stated that there are in tivation nearly twenty species of Banana,)ut fifty kinds of Aralia, forty of Anthu- m, fifteen of Pothos, thirty of Philodendron, nearly one hundred and twenty of Canna, eighteen of Zamia, and more than one hundred and ten of Ficus, while families better known and more popular are counted by hundreds!

Although the place is chiefly devoted to tender plants, and most of the dwarf hardy subjects are grown in the nursery in the Bois de Vincennes, there is, nevertheless, some interest taken in hardy plants, a part of the garden being devoted to a most extensive collection of Tulips.

NURSERY GARDENS IN NEW ZEALAND.

NO. II.—MR PURDIE'S NURSERY.

)ROBABLY in no one instance has the progress of Canterbury been more :ked than in the science of horticulture. In ts where, a very few years ago, nothing was)e seen but a barren waste, altogether aban- ed to fern and *tutu*, where the most com- e desolation reigned supreme, utterly roken by the presence of any human ıg, and where the ground was covered ı the wildest and most rank native vege-)n, gardens may now be seen on almost ry side, rivalling in beauty and fertility ı those of old England. The great draw- k to the natural beauty of the Canterbury ns was at first the total absence of those :ntial features to fine scenery—trees and er. True, we have the rivers Avon and ıthcote; but until their banks were ıted, as is now the case, they rather dis- red than embellished the scenery, by ing to the general appearance of wildness desolation. Now, however, trees com- ng every variety from those familiar to us he home country to the productions of tralia and Tasmania, are flourishing luxu- tly, forming a strange combination be- en the two hemispheres. Willows and lars flourish surprisingly, and the next generation may see our plains vieing with those of Lombardy, to which, in some of their general features, they bear a strong resemblance.

The garden of Mr Purdie is situated in the Papanui Road, and comprises altogether about eight acres. A more unpromising site for a garden could hardly be imagined, and great labour has been expended to bring it into condition. The land, actually under cultivation, contains an almost endless variety of plants, trees, and shrubs, sheltered from the bleak winds which so often sweep over the plains, and cause considerable damage both to the young growing plants and to the ripening fruits, by hedges trimly kept, composed of the Cape broom. Adjoining this planted part is a considerable area of ground, now being brought into cultivation, a work of no trifling difficulty, for it presents the aspect of a barren plain, the monotony of which is only broken by a scanty rough vegetation, composed of cabbage-trees and negroheads. The ground, however, is a rich peaty soil, and when broken up, will doubtless repay the energetic owner. The flax plants, which grow on it in profusion, add to the fertility of the soil, as the decayed matter is found very useful for gardening purpcses. The ground has to be first ploughed up, and then the large clods have to be broken, in order to produce a tolerable evenness of surface. A person who had seen the land a few years ago could hardly recognise the change which has taken place, or believe the rapid growth of the trees and shrubs. The garden contains an immense variety of plants: the apple, pear, and peach trees being at this season loaded with fruit. It is one of the strangest incidents in the Canterbury gardens at what an early age the fruit trees produce their crops. Some of the apple trees, barely twelve feet in height, and of a very small circumference, may be seen so loaded with fruit that the branches are actually weighed down with it. The blight has played sad havoc with some of them, and the young trees, in many instances, are as much disfigured and distorted as trees of old growth sometimes are at home. Mr Purdie possesses a fine collection of ornamental shrubs. The Coniferæ thrive here most luxuriantly; indeed, these plants seem to do as well, if not better, in the New Zealand soil than they do in England, and in a few years, owing to their rapid growth, they attain a considerable size. A fine specimen of the Arbutus Unedo attracted our attention. The Virginian cedar, and an endless variety of the same class of shrubs, are to be seen in Mr Purdie's garden. It would be a tedious task to attempt to enumerate them. We may, however, notice some fine specimens of the Pinus excelsa, and many other samples, such as the Pinus maritima, &c. There is a beautiful Viburnum japonicum—this is a most valuable and ornamental shrub, distinguished by a dark evergreen foliage; it would form a most desirable addition to a shrubbery, as there is no great difficulty in rearing it. The Ilex cornuta thrives well here, and is a very pretty sample of the holly. Another plant of great elegance deserves mention, the Wisteria sinensis. We believe that the one in Mr Purdie's possession is one of the few, if not the only, sample in Canterbury. He possesses some elegant and valuable shrubs and plants from Tasmania. From the latter place he has imported some specimens of the peppermint-tree; these are as yet but small, and we must await the result of the experiment of their introduction. In their own home they attain a considerable height, the leaves possessing a pungent flavour, resembling that of the plant from whence its name is derived. We must not omit a notice of an old acquaintance, the common Snowberry. The Chinese Privet grows well; it is a pretty plant, and easily propagated. We may fairly congratulate the owner of the grounds, of which a cursory sketch has been given, on the success which he has achieved, in converting so dreary a spot into a scene of great beauty and interest.

NO. III.—MR SWALE'S NURSERY.

Situated in Kilmore Street, Canterbury, it comprises about an acre of ground, and is almost entirely confined to the cultivation of fruit. In describing this garden, a little detail will be necessary. We will commence first with—

Pears.—The French sorts are cultivated with great care and skill, as well as other sorts from Belgium, and other places on the Continent, also from the Channel Islands. Last of all, must not be forgotten or despised the good old English sorts in the colony. We found upon inquiry that the collection of pears in this garden numbered nearly 70 sorts; many having bee
added, from time to time, from Sydney an
other places. We will hastily and brief
describe some of the kinds noticed. Flemis
Beauty, or Fondante du Bois, as it is som
times called. We were told that this pe
must be gathered before it parts readily fro
the tree, otherwise the fruit becomes dry a
musky. The tree we saw was loaded wi
fruit, and was a perfect picture. Glout M
ceau.—This sort is a good bearer; han
late on the tree, and is a very handso
pear. Gansel's Bergamot.—Rather a s
bearer, but blossoms profusely. Excelle
when ripe. Other sorts of pears we notic
in fruit, such as Beurre Rance, Beurre
Capiaumont, Passe Colmar, March Ber
motte, and Gansel's, and, last of all, but n
the worst sort, William's Bon Chretien, t

anches being weighed down to the ground ith pears, and just beginning to ripen. A ood deal of the success in this garden with ears has been through very seldom using e knife. Fruit trees in this country re- uire very different management to what they o in the mother country.

Apples.—The variety cultivated here is far o numerous to allow us to describe them. e will say a little about some of our most opular ones. Ribston Pippin.—We noticed great number of trees of this kind with eavy crops, and one tree in particular, hich had been grafted on a Paradise stock. e measured two or three of them, and in rcumference found them to be 12 inches. umelow's Seedling, or Wellington.—This is apple well known in the Colonies, and at ome. It is an excellent kitchen apple, a ng keeper, not apt to shrivel nor lose its iskness. We noticed some fine fruit of is sort on the trees; and we remarked, at e same time, good crops of the French ab. The French crab and Wellington ples remain in season until the early sorts apples appear. Many other sorts of ples we noticed; amongst them two seed- gs from pips. One of them turns out to very like the French crab, and the other good table apple, very much like the sort lled Court of Wick. There are two sorts Nonpareils and some very large King of e Pippins, and numerous other sorts, not getting the old favourite Golden Pippin.

Peaches.—Most of the trees are very avily laden with fruit, no unusual thing this country. American Pound Peach.— is is an American peach which found its y to Sydney, and from there to this pro- nce. We saw about half-a-dozen peaches a young tree, and the name it bears cor- sponds with the size of its fruit, for we ve not the least doubt one single fruit will eigh 16 ounces when ripe. We have almost many names for peaches as we have for ples in the Colonies, which causes a good eal of confusion.

Nectarines.—Only two kinds have been fruited in this garden as yet. Many young trees are flourishing of other kinds of nectarines, and will bear fruit in due course of time. Elruge.—The fruit of this sort is not ripe yet; but its merits are so well known that little need be said about it. Stanwick Nectarine.—This sort found its way here from Sydney, and seems to do well. We liked the appearance of the fruit on a young tree, and at the present time it is about the size of the Elruge.

Plums.—We saw a great variety of sorts amongst them, and some very healthy trees. We find that they are divided or classified according to colour of fruit, viz.:—Black or blue fruited, green fruited, red or purple fruited, white or yellow fruited. St Martin's Quetsche.—This sort seems to do well in this country, and it will be found in due course of time to be a great acquisition for the purpose of drying. It is very nice to eat from the tree as well.

Cherries.—We will just notice two sorts, which merit notice. Bigarreau Napoleon.—This large sort does well here. Black Tartarian.—Found to be a good black cherry, and valuable for its earliness. All sorts of cherry trees bear very abundant crops in Canterbury.

Of miscellaneous fruits, we noticed some round damsons, two sorts of grapes growing, with a fair crop on each. They were White Muscadines and Black Cluster; also, some medlars and pear-shaped quinces; and, last of all, some nuts of the true large Spanish cob. The nuts came out from England direct, for Mr William Wilson, some six years ago. The proprietor was in his employ at the time, and sowed them for him, knowing what they were at the time of sowing. The following season he purchased a young seedling out of the bed, and nursed it ever since with great care, and the result is, the bush has a fair sprinkling of large nuts on it. This is, no doubt, the first time this sort of nut has fruited in Canterbury.

MR BULL'S NURSERY, KING'S ROAD, CHELSEA.

THIS Nursery possesses an architectural frontage, equal in beauty to that of any establishment of the kind in the neighbourhood of London, and immediately in its rear is a winter garden, under glass of considerable extent, filled with fine specimens of ornamental plants, conspicuous among which are tree Ferns that line the pathways, their beautiful foliage forming a shady canopy overhead; variegated Aloes and Yuccas; noble Palms, Dracænas, and Araucarias; showy Azaleas, and Camellias, and handsome Laurestinus, Standard Bays, and Orange trees in tubs, as well as multitudes of other plants of other descriptions. Among the orange trees we noticed a pair so remarkable for their fine symmetrical forms, and so loaded with bloom buds just about to open, that even among the gayest of the gay, in the rich conservatories of the wealthy, they would be found to be valuable acquisitions.

But it is new and rare plants for which this establishment is justly celebrated, and to which we wish, on this occasion, more particularly to direct attention; foremost among these stands the new Melastomad Lasiandra macrantha, a plant which may truly be called magnificent, whether regarded for the size of its blossoms, the richness of their colouring, or the freedom and perpetuity with which they are produced. This plant was first made known by Dr Seemann, who published a figure of it in his "Journal of Botany" in 1864. It is a Brazilian plant, which has been figured in the "Botanical Magazine," under the name of Pleroma macrantha, Dr Hooker having merged these two genera in one. It has the good property of being nearly a perpetual bloomer, flowers of the richest violet-blue, and measuring five inches in diameter, making their appearance even in midwinter. It is a plant of easy culture, requiring to be treated in a similar manner to Pleroma elegans, which in general features it somewhat resembles; but which it altogether eclipses in the magnitude of its flowers, and the abundant way in which they are produced even in the case of small plants. These, when not more than half-a-foot in height, will yield six or seven large and brilliant blossoms. Another plant brought prominently into notice by Dr Seemann, and to be found here, is Antigonon leptopus, of which he writes, "the first time I saw this plant was in the autumn of 1848, when making a botanical excursion from Mazatian, on the west coast of Mexico, and it was the finest thing seen during the journey. It covered nearly every bush, and the deep rose coloured blossoms were so abundant that scarcely a leaf could be seen. In that part of Mexico where I first met with the plant, the natives term it 'Rosa de Mayito, and in Nicaragua, where I found it in 1867-8, 'Rosa de Montana, or Mountain Rose.' Of course, when looking closely at the shape of the flowers, there is not the faintest resemblance to a rose; but at a distance, a comparison with the Queen of Flowers would readily suggest itself, the outer three sepals being of a beautiful rose colour, the centre of a much deeper tint. The flowers, arranged in racemes and panicles, appear in the greatest profusion, and the bushes look as if a large rose-coloured sheet had been spread over them—a sight never to be forgotten. The flowers, like those of most Polygonaceæ, last for some weeks. I have traced the plant on the west coast of America from Nicaragua to Northern Mexico, and often looked for ripe seeds, but never could find any, and my belief is that it does not produce seed readily. During my last visit to Nicaragua, however, I was fortunate enough to procure, after many a fruitless search, a few seeds—not more than half-a-dozen; but off these, it is satisfactory to add that Mr Bull succeeded in raising several strong plants. I am well acquainted with the contents of our gardens, and the vegetation of most parts of the world; but I have no hesitation in giving it as my

opinion, that there is no more
l beautiful climber than Antigonon
It is hardly possible to exaggerate
and were I to add more in its
ight lay myself open to the sus-
I wished to write up an introduc-
is well able to stand on its own
Weir subsequently says of this
may be interesting to know that
olygonaceous climber, Antigonon
lescribed by Dr Seemann, grows
in the forests of the lower Magda-
en I first went up that river, in
1863, many of the trees in parts
ct to inundation, were literally
th its blossoms, reminding me very
he Bougainvilleas in the forests of
ing on board a steamer, when I thus
ould not then get ashore to ascer-
it was; and, on my return down
a few months later, I found it
scorched up by the drought, and
difficulty get a few growing shoots
nens. I looked in vain for seeds,
my want of success to the rapid
ently premature manner in which
had been dried up. The natives
r Magdalena call the plant Bellis-
often plant it near their houses,
nd roofs of which it rambles over,
etely covers. If it will only flower
ntry as well as it does there, and
rambling habit can be restrained a
ill, without doubt, be a fine "stove
A beautiful woody leguminous
led Pithecolobium prunosum, may
ound in Mr Bull's collection, the
nches, foliage, and inflorescence of
clothed with a rusty pubescence.
are bipinnate, with oblong acuminate
d the flowers, with their long ex-
hite stamens, grow in globular
om the axils of the upper leaves.
tive of Queensland and also New
les. To fine-leaved plants Ficus
s an acquisition. It is a fine, free
stove plant of noble aspect, having
tems, and large oblong-elliptic or
ate, petiolate leaves, which are
t rounded at the base, and acuminate at the apex, and measure 15 inches in length by 9 inches in breadth. These leaves, which are of a firm and moderately stout texture, are of a bright shining green, with which their stout white midribs and principal veins contrast very conspicuously, and give the plant, which is a native of the East Indies, a striking and handsome appearance. Another beautiful fine foliaged plant is Cyanophyllum Bowmani, a noble looking Brazilian stove plant, which requires less heat than C. magnificum. Its stem is erect and branched, furnished with large glossy leaves of a bold character, and of a fine shaded olive green above, but purplish beneath. It has a distinct and pleasing appearance, and may safely be said to be one of the best of that class to which it belongs. Everybody was charmed with the scarlet and white flowered Clerodendron Thompsoni, when it first made its appearance some years ago at South Kensington; then came the more showy C. Balfouri, and now Mr Bull has a new variety, called C. speciosum, which, he says, may be regarded as one of the gems of the season as a handsome and effective exhibition plant. It is stated to be a cross between C. Balfouri and C. splendens. It partakes of the character of the latter in its large and dense dichotomous cymes from which the flowers are produced; in this variety, instead of the calyx being pure white, as in Thompsoni and Balfouri, it has a reddish hue, and the corolla, instead of a bright scarlet, as it is in the kinds just named, is a deep rose, slightly shaded with violet, the marginal portions being of a bright vermilion. The foliage is smooth, oblong-ovate, of a rich dark green, and, as the plant possesses a free habit, it makes an exceedingly beautiful stove climber, while, as the blossoms are produced in the greatest abundance, it is equally effective when grown in the form of a bush in a pot for purposes of exhibition.

To hardy deciduous shrubs, Styrax japonica is a good addition. It is compact in growth, has bright green elliptic leaves, and produces in profusion white flowers, somewhat resembling snow-flakes. Like Deutzias, Spiræas, and other things of that sort, it will be found to be valuable for early forcing, while in open borders it will be both useful and ornamental. Foremost among subjects of a hardy character, however, should have been named the extremely handsome Magnolia Campbelli, our first knowledge of which in Europe was derived from "Illustrations of Himalayan Plants." "This superb tree," says Dr Hooker in that fine work, "which forms so conspicuous a feature in the scenery and vegetation of Dorjiling, was chosen by Dr Thomson and myself to commemorate eminent services rendered to science by our friend Dr Campbell. It was discovered by Dr Griffith, in Bhotan. It is a large forest tree, abounding in the outer ranges of Sikkim, at elevations of 8000 to 10,000 feet, appearing on the road above Pacheem, and thence ascending to the top of Sinchul, 8000 feet, and Tonglo, 10,000 feet, though occasionally seen on the central ranges at the same elevations, it is much less frequent. The trunk is straight, often 80 feet high, and twelve to twenty in girth, covered with black bark; the wood is soft and almost useless. The flowers are produced abundantly in April, at the end of all the branches, when the tree is as yet leafless. They vary from white to deep rose colour, or almost crimson, and in size from 6 to 10 inches. The scent is faint. In May the tree is in full leaf, and the fruit ripens in October, when a few small and often deformed flowers are sometimes produced. Young plants have the leaves perfectly glabrous; those of older trees are more or less silky on the under surface. There are two other species of this genus in India; one (M. globosa) has hitherto only been found in the interior valleys of Sikkim, where it inhabits the skirts of woods, 9000 to 10,000 feet elevation. It is a small, also deciduous, leaved tree, with globose flowers, snow white, and as large as a small fist, which appear with the leaves in June, and are very sweet-scented. It is closely allied to the Japanese M. conspicua of our gardens. The third Indian species, M. sphenocarpa, is a native of Chittagong, the Khasia mountains, and Nepal, where it inhabits subtropical valleys. M. Campbelli and globosa would doubtless prove hardy in England; but M. sphenocarpa would require an almost tropical heat." It will thus be seen that we have at last had added to our hardy ornamental flowering lawn trees, a glorious acquisition. An exceedingly attractive and effective subject is also Malus floribunda pendula, a fine drooping tree, the long pendulous branches of which are loaded in spring with charming rose-coloured flowers. Cerasus pendula floribus roseis is likewise a fine ornamental plant, and extremely free flowering; it is alike suitable for shrubbery and flower garden decoration. Viburnum Sieboldii is likewise well worth notice. It is a bold and effective Japanese evergreen shrub, which has sometimes appeared under the name of V. awafurka. We likewise remarked a weeping variety of hazel nut (Corylus avellana pendula) of an exceedingly ornamental character, its drooping habit of growth producing a pleasing effect. It received a prize at the International Exhibition at Paris in 1867.

Among hardy plants may also be classed Bambusa argentea striata, a handsome Japanese bamboo received from Dr Regel of St Petersburg. Like all bamboos, it is exceedingly graceful, moderately vigorous in habit, and the leaves, which are 3 and 4 inches long, and about three-fourths of an inch broad, are of a full green on the upper surface, glaucous beneath, and variously striped, but usually freely with white in suitable positions in ornamental grounds this bamboo, therefore, cannot fail to be favourite. Variegated hardy plants have als received good additions in Holcus lanatu albo-variegatis, a well marked white-stripe perennial grass; and in Alopecurus pratensi aureo-variegatis, another perennial grass, wit leaves streaked and edged with yellow. W likewise noticed a variegated variety Cryptomeria japonica, the points of whos shoots look as if they were coated with snow Need we say, therefore, that it will make fine ornamental lawn tree.

Of Palms, Mr Bull has a rich collection, i which we specially noticed Calamus excelsu a Bornean species of neat and elegant appear nce, more especially when young; also C. pectabilis, a slender growing palm raised om seeds obtained from Malacca; C. deal- ata, a charming little species from Mada- ascar, with pinnate arching leaves, having arrow leaflets silvery beneath; and C. Oskey- nnus, another fine species. To the genus eonoma some important additions have een made, foremost among which stands eemanni, a beautiful palm, the singular ilobing of whose leaves, and their obvious laiting, give them a very marked character; lso G. zamovensis and G. imperialis, both aluable acquisitions. Gansia princeps, De- enia nobilis, and Dæmonorops plumosus e also all fine palms, especially the last, hich is one of the most elegant of the family, nd being of small growth, is admirably dapted for vases and table decoration. tychosperma Alexandræ and elegans are kewise handsome species of free growth, the tter remarkable for its bilobed fish-tail-like aves. P. laceratum is also a fine species of pparently a dense, close habit of growth. ttalea limbata, Martinezia Lindeni, Œno- rpus dealbatus, and many others, likewise eserve notice; but we must pass on to the ass of variegated palms, a comparatively new ction, which, when better known, is sure to e greatly coveted. Foremost among these and Curculigo recurva variegata, a long, road, ribbed-leaved kind, beautifully varie- ated; as are also a gold variegated variety f Raphis flabelliformis, the golden variegated hamœrops Ghiesbreghtii, and others, all onderfully fine things in their way, which nly require to be seen to render them sub- cts of universal admiration.

Of Orchids, a choice collection is cultivated ere, in which we noticed plants of Dendro- ium Falconeri growing freely in baskets; lso D. giganteum, D. Bensonæ, D. crystal- ium, and the charming D. Wardianum. ssociated with these were also Thunia Ben- onæ, the rare Cattleya Dowiana, Cystoptera ava, a scarce and beautiful terrestrial Orchid om the North of India, Lælia crispilabia, a ne Brazilian species; various Odontoglos- ums, among which are Nævium majus and escatorei, both gems belonging to the cool section; a golden variegated variety of Phaius grandifolius; a new white Aerides; and last, but not least, Cypripedium Reichenbachi, a Costa Rica species, dried specimens of which indicate that it is a most profuse bloomer, from thirty to forty flowers being found on a stem. This, when well grown, must, therefore, make a most effective exhibition plant.

Among tender Ferns, fine forms of which are abundant in this establishment, we remarked the handsome Adiantum Farleyense, A. Lindeni, a fine kind introduced from the neighbourhood of the Amazon; A. Seemanni, a variety related to A. Wilsoni, and A. macrophyllum; A. velutinum, a noble species from Columbia; Gymnogramma Laucheana gigantea, with fronds richly powdered with gold Alsophila glauca contaminans, a remarkably handsome species from the Philippine Islands; various fine kinds of Athyrium; Nothochlæna candida, a charming little silver fern; Pteris flabellata ascensionis, a compact growing sort from Ascension, and Cibotium regale, all exceedingly beautiful forms of this deservedly popular class of plants. Hardy sorts, also, comprise many novelties, among which may be named Lastrea floridana, a robust growing species, notable for the rich deep green colour of its leaves.

Of new and rare Stove plants, in addition to those already mentioned, one or two may still be particularised with advantage. Prominent among these is Allamanda nobilis, which is undoubtedly one of our best stove climbers. Its flowers measure fully 4 inches in diameter, and are of a clear bright yellow; the Brazilian Bertolonia margaritacea superba, with leaves dotted all over, as it were, with pearls, is also worthy of notice, as are likewise the South American Dieffenbachia eburnea, the best of this genus yet introduced; Dracæna excelsa, a stately habited plant of glacous metallic crimson colour; Dipladenia amæna, with flowers of a lovely pink colour suffused with rose, and produced in the greatest possible profusion; one or two fine kinds of Encephalartos; Marantas of various sorts, more especially M. Chimboracensis, with tricoloured foliage, the silvery M. virginalis, M. princeps, pale green, with dark midrib, and M. amabilis, with a white feather laid in the centre of each leaf. In the same collection were, moreover, Guzmannia fragrans, and Vriesia Glaziouana, two fine plants of noble. aspect; Eranthemum Andersoni, a charming plant, from Trinidad, the beauty of whose spotted white flowers, arranged in spikes, is equal to that of some of the most lovely of Orchids; Hemerocallis picta, with leaves spreading out like the ribs of a fan, and elegantly arched; Parmentiera cereifera, the "Candle Tree;" Passiflora glauca, with large white and purple blossoms; P. trifasciata, with leaves overlaid with rosy lines or rather bands; Tillandsia Lindeni, and the fine-leaved plant from Madagascar, called Terminalia elegans.

Among new or rare Greenhouse plants may be named Agave Seemanni, which belongs to the smaller growing section of the genus; Casimiroa edulis, which, Dr Seemann says, bears fruit like an apple, and thinks may prove hardy in some of the southern parts of England; Gaultheria punctata, a white blossomed, black-berried plant, nearly always in flower or berry; G. leucocarpa, another white flowered Java plant, with white berries, which contrast prettily with those of punctata; Podocarpus Maki variegatus, and P. macrophyllus variegatus, with white striped carnation-like leaves; various variegated kinds of New Zealand Flax; Tecoma mirabilis, a neat growing climber, producing abundant racemes of handsome orange-coloured blossoms; and Trichinium Manglesii, the downy, rosy flower heads of which, when cut before too far advanced, keep in perfection for weeks at a time. These constitute a few of the more conspicuous in this class, but many more equally deserve notice.

Plants of a soft wooded character also receive special attention in this nursery, the collection of Pelargoniums in which is one of the best in the country. Among new double flowered zonal kinds, Consul, Emulation, Memnon, Navarino, Sparkhill Beauty, and Sunshine, are charming examples; while, among new ordinary zonals, Basilisk, Expedition, Firefly, Hogarth, Lady of the Lake, Pearl, and Resplendent, are among the best. Foremost among new nosegay kinds stand Ample, Concord, Guardsman, Masterpiece, Profusion, and Torchlight.

The now fashionable genus, Coleus, has received some important additions at Mr Bull's hands, among which may be named Chancellor, Elector, Hero, Provost, Refulgens, and others, all with foliage finely coloured and distinctly marked.

Among Petunias, the names Caroline, Celebrity, Diana, Gladiator, Modesty, and Recognition, will be read with interest; for fine kinds of Mimulus this nursery is famous; and we noticed two new bedding plants in the shape of Iresine Lindeni, with lanceolate deeply coloured leaves, and I. acuminata, with somewhat larger ovate-acuminate leaves. The foliage of both of these is striking and effective. Mesembryanthemum includens nivalis promises also to furnish good material for bedding purposes, as does also Coprosma Baueriana variegata, which, in borders or ribbon planting, is extremely effective. Among other things are also one or two good new herbaceous Lobelias, prominent among which stand Charm and Marvel—the former reported to be bright blue, the latter puce, with light centre. Of these, and others of the same class, we hope to give some more particular account hereafter.

Our readers will recollect that a paragraph, extracted from one of Dr Seemann's letters, about a gigantic Aroid discovered by that gentleman in the mountains of Nicaragua, had the good fortune to make the rounds of the papers, not only English but Continental.

"I dare say," says Dr Seemann, the other day, in the *Gardeners' Chronicle*, "some thought, when reading of the dimensions o the plant, that I, when penning that para graph, allowed my imagination to run riot and was dishing up a mere traveller's tale But I took the precaution to preserve the flowers in spirit, and to send Mr William Bull two fine rhizomes of the plant. Both o the latter are now growing, and one of them received in England only on the 17th o April, is now in a fair way of proving that I rather understated than overstated the case It is in a pot of only 11 inches in diameter, and on the 28th of June the petiole of the lant has only one leaf at a time) high and 9 inches in circumference; is not yet developed, and I believe this communication sees the light, will have attained more than 10 ight it had in Nicaragua. It looks huge snake (beautifully mottled) olt upright at the command of some armer. I may add that the leaf in t state already exceeds the largest dimensions of all other Aroideæ habit, and, when fully developed, out to be what I said, the largest h in leaf and flower, of which we zance. The flowers being herma- ot diclinous, the giant in question cannot be referred to Amorphophallus, Conophallus, or allied genera of the eastern hemisphere, but will, on closer investigation, prove to be either a genuine Dracontium, or the representative of a closely allied new genus, which 'Punch' has asked me to name after Gog and Magog. It would not be the first barbaric name we have in botany, and probably not the last either; and who knows what, after due consultation with the City Corporation, I may do!"

This plant, to which the press has been pleased to attach so much importance, may be seen any day growing most satisfactorily in Mr Bull's establishment, and, we may add, is well worth inspection.—*Seedsman.*

STANSTEAD PARK NURSERY, FOREST HILL.

E Nurseries, which belong to Messrs wnie, Laird, & Laing, are at pre- orth inspection, containing, as they ine novelties raised by that enter- n. A broad gravel walk, with rib- rs on each side, devoted to the new bedding plants, such as Lobe- anulas, Calceolarias, Verbenas, and ms, conducts the visitor from the nce in the Forest Hill Road to of the nursery, where there is a nal circle filled with choice plants. is occupied by a fine specimen of ia, surrounded by diamond-shaped ld and bronze Pelargoniums and Verschaffeltii, each being divided other by means of lines of Cen- arrangement which has a neat and pearance.

rsery is very conveniently situated trade purposes, being only five London Bridge, and one from l Station. The Crystal Palace at is within half-an-hour's walk of it, derstand that from this nursery is furnished decorative plants for the alace on great occasions—such as those of the visits of the Prince of Wales, the Viceroy of Egypt, and other Foreign Potentates.

Let us first advert to the florist flower department, for which this nursery has long been justly celebrated. The collection of Hollyhocks here is everything that any one could desire. True, owing to the dryness of the summer, some are scarcely so good as we have seen them; but still the majority are producing splendid spikes, especially some of the newer varieties, such as Belladrum, a fine dark rosy crimson, with large smooth petals and perfect in form; Black Douglas, the most brilliant dark which we have yet seen; J. R. Kinmont, salmon, shaded with fawn, spike large and effective; Queen of Primroses, bright primrose; flowers perfect in form, closely set on a large and fine spike; R. B. Laird, dark ruby crimson, flowers large and fine; and James Whitton, clear rosy salmon flowers perfect in shape, neatly arranged on a spike, admirably adapted for purposes of exhibition.

Owing to the dry weather which has prevailed this summer, Pansies have been almost a failure, the only one in flower at the time of our visit being the well-known bedding kind called Imperial Blue—a variety which appears to resist the evil effects of drought and heat better than most others. Being very dark blue, its appearance is very striking, and *en masse* highly effective.

Of Antirrhinums and Pentstemons we found here a magnificent display, well worth going any distance to see. In addition to the beautiful seedling Antirrhinums raised by this firm, it possesses all the Continental varieties yet introduced into this country. Artist, Grand Duke, Miss Ruth, Striped Unique, The Rival, Beauty, Cherub, Clipper, John Downie, Leopard, Rose, Striatum perfectum, St George, and War Eagle, are the kinds well varied in colour and worthy of being added to any collection.

Pentstemons appear to be an improvement on those of other raisers, and therefore deserve special attention. Some of the best among them are Arthur Sterry, rosy purple, with pure white throat. The Lion, dark crimson, with a white throat, spike large and good. Mrs A. Sterry, rosy peach, with white throat, spike very effective. Purple Perfection, purplish crimson, with a white throat, veined with rose. Purple King, purplish violet, with white throat striped with rosy crimson; and Sunrise, light rosy crimson, with pure white throat. Other good sorts consist of Colin Bell, Dr Hogg, George Sand, John Pow, Leon Laprevot, Miss Carnegie, Regalia, R. Parker, Shirley Hibberd, and William Thom, all varieties bright in colour, free flowering, and in all respects desirable.

Of Phloxes, a fine collection is kept here in pots expressly for purposes of exhibition. The more distinct among them appeared to be Adelina Patti, Comtesse de Chambord, Madame Domage, M. Veitch, M. Linden, and Queen Victoria, all of which are real gems in their way, more especially M. Linden, which is one of the very finest Phloxes yet in cultivation: it is bright scarlet, with flowers as large as those of a geranium, and in habit it is very dwarf and compact. Among older varieties we noticed Amabilis, Gloire de Neuilly, La Candeur, Liervallis, Premices des Bonheur, and Venus, all distinct and good.

There is a nice collection of Dahlias here, in which the finest flowered new kinds are Mr Dix, One in the Ring, Julia Wyatt, Indian Chief, King of Primroses, Lord Napier, and Mrs Brunton. Older varieties consist of John Dunnington, Sam Naylor, Autocrat, Caroline Tetterell, Gazelle, John Sladden, Lady Derby, Madame Neilson, Memorandum, Purple Gem, Sir Grevill Smith, and Yellow Perfection.

We also noticed a choice collection o Gladioli, consisting of very distinct kinds, and of all the newest and finest varieties, among which some of the best were Mis Furtado, James Veitch, Lord Byron, Shakspere, Moliere, Princess Clothilde, and Mathilde. These are blooming beautifully, a is also the well-known Brenchleyensis, which when grown in masses, is most effective, and which, where brilliant decoration is th object sought for, cannot yet be dispensed with.

Roses are largely grown by Messrs Downie Laird, & Laing, a fact which will be apparent when it is stated that one brake alon contained some 15,000, and that upwards o 22,000 were sold from this nursery last season. Need it be a matter of wonderment therefore, that London suburbs shoul "blossom like the rose," and that the quee of flowers should be so commonly met wit in the button holes of most "city men."

Fruit trees are likewise cultivated here t a considerable extent, such kinds as pears peaches, plums, and apples, succeedin admirably in the heavy clay of this district Figs, too, luxuriate in pots, in yellow loam which is provided for them, as do also po vines, for which Stanstead is fast becomin celebrated.

Of hardy decorative plants there is, mor over, a fine stock, which includes conifers large size, kept for immediate effect, great advantage to planters of new vill grounds, of which there are plenty abo Forest Hill. Even the Wellingtonia is muc sought after; but of all evergreens for Londo work the Aucuba is the best, standing smok apparently without injury.

Of Gold and Bronze Pelargoniums som magnificent varieties have been raised he by Mr Laing, who has bestowed much labo and pains on the subject, the result being one of the finest collections anywhere to be seen, and one that has been unusually successful at South Kensington, the Crystal Palace, Paris Exhibition, and at other places. The different members of which it consists are so nicely grown, well coloured, and symmetrical, that Mr Laing is of opinion they will take the place of the Tricolors, not only for bedding purposes, but also for conservatory decoration. Prima Donna, Red King, Stanstead Beauty, Imperatrice Eugenie, Crown Prince, Mrs A. Lowndes, and W. R. Morris, are considerably in advance of any yet in the Trade. The best for bedding will probably be Mrs Lewis Lloyd, a kind not yet sent out.

The glass department consists of eleven show-houses, with a proportionate amount of pits in which to winter the large quantities of bedding materials that are propagated here. The houses are compactly built in two rows, each having a door leading into a spacious packing-shed, in which, during the busy season, there is "no end" of bustle. Besides, there is a warehouse at one end for the execution of seed and bulb orders. The Conservatory, the first house entered, is filled with specimen plants, consisting of Camelias, Azaleas, Ericas, Coleus, large Orange Trees, and Tree Ferns, all exhibiting careful management. The next three compartments contain newly propagated "stuff," just beginning to push into active growth. Other two houses are devoted to seedling Pelargoniums, belonging to the nosegay and zonal sections, many of them promising to be improvements on existing kinds, some even having already received certificates at South Kensington Prominent among them may be named Lady Kirkland, rosy purple; Lady Hawley, light orange scarlet; Stanstead Rival, dark crimson; and Sunshine, deep rich scarlet—all charming varieties of hybrid Nosegay.

One hosue is entirely filled with fine foliaged plants, such as Caladiums, Crotons, Dracænas, Ficus, and Coleus, the latter being greatly in demand for the decoration of the dinner-table, ball-rooms, and other places of public entertainment. Some promising seedling Tricolor Pelargoniums occupied another span-roofed house, in which were also some fine specimen plants of most of the old standard sorts of Pelargonium, such as Mrs Pollock, Sophia Dumaresque, Lucy Grieve, Italia Unita, Queen Victoria, and Sunset—kinds too well known to require description. An adjoining lean-to house is wholly filled with Fuchsias, consisting of the best of both the double and single flowered sorts, all well grown half-specimen plants.

Cucumbers are largely grown here for seed, a house being specially set apart for that purpose, in which old varieties are also tested against so-called new kinds. A valuable "strain" has been obtained here by means of skilful hybridization which, as regards size, flavour, and shape, has few equals.

In what is termed the plunging ground we noticed Roses in pots, Tree Carnations, Chrysanthemums, and Alpine plants, which, being in pots, are ready for removal at any season. Altogether, the Nursery does great credit to Mr Laing's superintendence. It is in excellent order, and at present full of floral beauty.

A NEW CLASSIFICATION OF ROSES.

THERE can be no doubt that when Rose Nurserymen first commenced to cultivate roses for sale, and began to import all the new varieties which they could procure from France, where these flowers were, and are still, raised in abundance, it was necessary, in some measure, to keep up certain distinctions for the convenience of ordering them, and that the catalogues of the Trade were, to a great extent, copies of those printed on the Continent. We wish it had not been so, because we are perfectly at a loss, when looking at roses in flower, to decide to what section they belong; and when we look to the label and see H. B. for Hybrid Bourbon, H. C. for Hybrid China, and any other of the letters that indicate Gallica, Provence, Damask, Hybrid Perpetual, and the rest of the families, we are no wiser; because, although we see what they call any particular kind, we cannot see why they call it such and such. We are borne out in this view of such numerous distinctions by the fact, that the raisers are often in doubt to which family they are to place the name; and it has not unfrequently occurred that different growers importing a rose have placed it in different sections, so that a Rose Catalogue, with all its explanations, is but a puzzle which few understand; and buyers merely acquiesce in the use of them, without inquiry, because they have a reluctance to ask questions. The distinction between many of the families or sections are so nice as to baffle all ordinary observers; and, we think that, as everybody who has a garden has become a rose grower, Trade Catalogues should be made readable to everybody. Mr Rivers has done the best that can be done to reconcile us to the numerous sections; but it must be an enthusiast to follow him through all the intricacies that decide to what particular family a rose belongs; nor do we think it wise to divide roses into so many classes, when it is quite possible to arrange them under a few divisions which everybody can understand. We threw out this hint once to a rose grower, and he agreed with us; but he found certain difficulties in the way: for instance, there are some roses bearing the same name as others of a different family, so that the family name is the only one by which a rose grower would know them by, as Rose A. Provence, and Rose A. Gallica, or Rose B. Hybrid China, and Rose B. Perpetual. This is, however, but a trifling objection, and the roses thus duplicated by name are comparatively few. The evil of dividing roses into so many different families is increasing every year; for the acquisition of new flowers, requiring to be placed somewhere, perplexes even raisers; and we have heard one of the most experienced growers for sale, say that he hardly knew in what section to place a novelty. It was a *little* like this, and there was a *little* of that in it, but it was *not much unlike* some others; and the truth is, that there are scores of varieties which, if jumbled together, no grower in the country would be able to put into their original sections again by merely looking at their peculiarities. They might, from old acquaintance, be able to name the greater part of them, and from memory place some of them where they originally belonged; but, from their mere habit and growth, they would not be accurately divided again and put in their proper places. Again, i is worthy of remark that there are instances o roses having been originally placed wher they ought not to be according to presen notions; but it is not usual to remove a ros from its section, even if the parentage and distinction be questionable. Upon the whole therefore, we consider the present division or families of roses to be too numerous, and not sufficiently indicative of true character t be useful to the multitude.

We do not say that the origin of all the separate families may not have been distinct but the numerous varieties of roses since produced from seed, and partaking more or less

acteristics mixed in all manner of ways,
s classification so difficult, that it need
wondered at that different growers
some of them in different families.

r, there are some features in roses so
istinct that all the world can compre-
hem; and we wish it were possible to
ll roses under such divisions, sections
ilies, as would be understood by any-
For instance, the two old Chinas,
le and the crimson, are familiar. The
rity of their habit is to be constantly
gand blooming, and they have a smooth
These features are so striking, and
so valuable, that nobody could be mis-
in placing a new rose in its right sec-
f it had anything about it so distinctive
eral features. We confess, therefore,
e should like to see all roses which
mooth barks, and that continue to grow
oom during all the mild weather of the
year, placed under one head.

re is another family or section equally
g, if not equally popular; we mean the
r roses. The common Cabbage Rose
cottage gardens, so well known as to
o description, except to identify the
has a rough bark, very full of prickles,
s once, and is done with. Roses of
ind have been superseded by more
uous bloomers; but there could be no
ty in bringing under this section all
ssess the two distinguishing features,
rough bark and the single season of
ing.

ird family, easily distinguished and well
tood, might, and, indeed, is made of the
Roses, of which there are now very
varieties, all beautiful in their way;
re more handsome and of better habit
thers; but, inasmuch as the beauty of
s Rose is concealed when fully blown,
emi-double flowers are tolerated in this

Briers might be made another family,
e they are distinct in their habit, and
not be mistaken or put out of their

are not going to insist upon these divisions or sections being the best that could be adopted; but they have the advantage of being familiar, and may furnish sufficient inducement to cause growers, capable of devising a better classification of roses than at present exists, to bring the whole matter under consideration.

There is a very distinct class of roses called Perpetuals, which might form a class by themselves; and as to Bourbons, Hybrid Chinas, and all manner of Hybrids, we would have them under one or other of the families which we have mentioned. If they are continuous growers and bloomers, they should be under the families represented by the Chinas and Perpetuals. If they are rough barked, and flower but once, they should go among the summer roses. If they are mossed, there can be no question about their family. It may, however, be said that there are other families or sections as distinct as these, and quite as well known to rose growers. The Noisettes, for instance, may be said to comprise roses that bloom in bunches; but that is not distinction enough, because many roses do that more or less, and there are some Noisettes, so-called, which by no means possess that character so distinctly as to warrant the classification. Others will affirm that climbing roses are very distinct, but here the same objection prevails, climber or not climber, merely depending on the height to which a rose will grow. The common China Rose may be made to cover the whole front of a house, and is as complete a climber as any, though it may not be so rapid a grower as many. We would have the family settled by a more distinct feature than that of merely being what is called a climber. We will allow that the Bourbons, the Gallicas, the Provence, and many more, were at one time sufficiently distinct; but distinctions of that description are useless now, because the crosses or hybrids partaking of the different features are bewildering and numerous. The Bourbons are a fine family, but they are China in habit all the world over; they grow and flower continuously, they have a smooth bark, and they strike freely from cuttings. They have better flowers than those of either of the Chinas; but they might with many other varieties or families be transferred to the family distinguished by smooth barks and continuous blooming; and, we believe, it would be greatly to the benefit of the rose growing community, if all roses were divided into about half-a-dozen distinct sections, characterised, as we have mentioned, by some feature which ordinary observers could appreciate.

HOW THE TRICOLOR PELARGONIUMS ARE RAISED.

We have two letters before us (*T. B., Dublin*, and *J. T., Bury*) asking for information relative to the propagation for sale of the Tricolor Zonals. We think that the following remarks by Mr W. Smith, which appeared recently in the *Gardeners' Chronicle*, will afford the best reply we can give to our correspondents :—

"So many thousands of these variegated seedlings have been raised, and by so many different hands, on different soils, and under different circumstances, that there can now be no doubt that variegation (in Pelargoniums, at all events) may be, and is reproduced from seed. There is no difficulty in performing the operation of cross-breeding; nothing can be easier. Every lady in the land may raise an improved Mrs Pollock, or any quantity of them, with her own hand; it is simply necessary to remove the anthers from the flower chosen to bear the seed (before the pollen is displayed), and then, as soon as the little horns of the pistil curl backwards, to apply to them the pollen from the flower chosen as the male parent. It will have been noticed that Mr Grieve, in all the examples given (with one exception, and that his first attempt), chose a dark zoned variety for the seed-bearer, and fertilized it with the pollen from a variegated sort—Mrs Pollock, for example. In the exceptional case, he had simply reversed this. There is no doubt at all that the first plan is the best, and by 'best' I mean that it will yield a far greater per-centage of variegated seedlings, and of better quality. I think, also, I have a glimmering of the reason of this, thanks to the late Donald Beaton, who proved over and over again, that in the races of Pelargoniums from which the tricolors have been raised, the leaf is always like that of the pollen parent, and he gives the following example:—'Cross Tom Thumb with the pollen of a horse-shoe variety, and the seedlings, will all have the horse-shoe leaf; cross the deepest marked horse-shoe variety with the pollen of Tom Thumb, and all the seedlings are plain leaved.' How is it, then, that Mr Grieve was able to raise Culford Beauty (a variegated seedling) from Flower of the Day by pollen from Cottage Maid, a green zonal?—that Mr Aldred raised Sophie Dumaresque from Sunset by the pollen of the green zonal Excellent; and that many other cross breeders have been successful by the same process? In the limits of an essay it is impossible to do more than indicate possible answers; indeed, a perfect answer remains to be found. Again, I must call Beaton to my aid; he has proved that the pollen of the strongest plant (or coarsest, as some would say) takes the lead in influencing the progeny. If, for instance, the pollen of a weak growing variety be placed on four of the five divisions of the style, and pollen from a stronger-growing variety be placed on the fifth division, the seedlings will all have foliage like the stronger. Does not this shew that, to ensure a given result, something more is required than simply placing pollen upon the style? May not the disease (or affection) called 'variegation be able so far to overcome the power of the pollen from the coarser-growing zonal, as to transmit itself to the seedlings in certain cases, as, when the pollen-bearing plant is a weaker grower; or not in prime health, if a

:r grower; when the pollen itself is ıre, or produced by the anthers of the tamens—anything, in fact, which should ıfficiently restrain the power of the ? Whatever may be the cause, the mains: that the best plan is to let the zonal be the seed bearer, and this is ın adopted by cross breeders generally. s this all: the pollen borne upon the ıortest stamens seems to have special in increasing the tendency to variega- but with one drawback, that it also ; the seedlings.

: plant intended to be the seed-bearer l be two years old, and must not have :d from free-flowering in the previous it should have made all its roots, and have its pot brimful of them. Not more than one truss of bloom should be allowed on each strong branch; the two or three first and last blooms should be discarded; all the blooms to be crossed on one plant should be done as nearly as possible at the same time, and the plant should be carefully stopped from the first day of crossing. These are the directions given by Beaton—he calls them his 'secrets,' and we need wish for no better guide.

Lastly, do not be in a hurry to throw away those plants which shew no sign of variegation early in life, as eventually they may prove the best; for precocity in plants, as in a man, is too often the sure forerunner of an early death, or of a premature old age."

CONSTRUCTION OF ROCKWORK.

ᒥE supplement the directions given last month from the *Field*, with the ing practical observations by a corre- ent of the *Gardener's Magazine*:—

the important subject of the construc- f rockwork, I must first say that, if the ın which it is proposed to form it affords itable features, it would be unwise to ɔt it, unless a large expenditure of money ɜ spared for the purpose. In that case, t any spot, however destitute of natural es, can, by taste and judgment, be red suitable; but where there are y formed quiet dells and rising eleva- the art of man has only, as it were, to ıe finishing touch, and to be careful not orm the outlines of nature. There are eds of noblemen's seats in this country offer suitable features, and in such cases ıt is wanted to form them is taste and ıent in grouping the rocks, so that they t have the appearance of piles of stones ıively placed there. If I were to choose : for the formation of a rockery, it would ere the ground was somewhat undulat- ı a quiet and retired part of the grounds; and if a stream of water could be embraced in the scheme, and a few noble forest trees to make up the picture, I should not require more. I should feel that nature had been liberal in furnishing aid; for, with such features for the designer to work with, it would be a discredit to him if he did not ensure a satisfactory result. The water in its course may in one place be made to shew a gentle rippling current, playfully coursing over a pebbly bed; while, in another, its gentle murmur should be heard as it comes either over or through a rising rock to fall gracefully into a pool below, to trace again its course through open shallows clothed with fern, and lose itself at last in a rich confusion of reeds and underwood. A rustic bridge should be so placed as to offer a good view of the stream on either side as the visitor crosses over. With water as an adjunct to a rockery, so much can be done to vary the scene, and to create distinct and beautiful features, that there is hardly a comparison to be drawn between a rockery that has a stream of water passing through it and one that has none, or if any, only a stagnant pool.

Sometimes a stream may be turned in its course, and so brought into use; and even if it should be a work requiring great labour, the result would be worthy of the outlay. The advantage of having some noble trees upon the spot would be another feature which would enable the designer to incorporate complete features that would otherwise take years to render perfect; for, in the first place, their shade in summer-time is very acceptable, besides giving, as they do, a character to the place. Trees not only render shelter and shade, but their existence is an encouragement to those natural beauties which occur spontaneously, if human hands will but leave nature alone.

Let us now consider the interests of those who have not such natural features to aid them, who wish to improve spots where all the necessary features require forming. Strictly speaking, these are the positions that will ultimately secure to the designer the greatest credit, because, if he does his work well, every feature in the place will be of his own creating. The only way to secure the proper formation of a rockery in such a spot is to draw out various different ground-plans of the spot, and compare them with the actual position. It must always be borne in mind that the more natural forms of walks and rocks should take the precedence, although there are exceptions to the rule, as in the case of any bold feature to be displayed, or if the position of the ground renders necessary some peculiar conformation. Still, as a rule, the more graceful and orderly the walks, which are to shew the characters of the spot, the better; but, at the same time, straight lines and geometric principles of designing must be discarded altogether; for, unless a rockery presents for the most part the appearance of a natural formation, it will soon fail to yield pleasure even to the uninitiated in such matters. A few bold and telling features will give more gratification than a host of fancy subjects that are neither one thing nor the other, neither wildly rustic nor perfect gimcrackery.

Presuming that the position is chosen, and the spot for every feature of note decided on, the next business should be the carrying the plan into effect. At this point we must look at the position of the ground. An even surface is anything but desirable; in fact, it cannot be tolerated in a rockery. Excavations, therefore, to raise mounds of earth, and to form quiet dells, are necessary; but where they are formed, water will accumulate in the majority of soils, and unless there is an outlet to conduct this water away, we must not attempt to go lower with our excavations than we can secure a proper drainage for. It is important to bear this in mind; for, if the position should be low, such a result must follow; and few people would like to inspect a rockery if, by so doing, they had to wade through a portion of it ankle-deep in water. Then as to the number and disposition of the rocks. It must be borne in mind it is not their number that makes a display, but a judicious disposition of them, so as to afford a varied and distinct class of characters in them as they are presented to view. Bold rugged masses here and there are admissible; but they must not all partake of that character, or the scene acquires sameness and tameness. To form distinct features, some should be gracefully clothed with sheets of vegetation suitable for the position, while others should stand out boldly as if they had battled with the storms for ages past; others should shew precipitous outlines and overhanging summits. With such management, there will be ever cropping up some fresh subject for the visitor to see and admire.

No one should undertake the formation of rocks who is not to some extent acquainted with the laws of mechanics. Such knowledge enables the artist to place the materials used so as not to be offensive to practised eyes, so as to avoid, in fact, what we may call anachronisms. There is no disputing the fact that the majority of our English-formed rock-works have been constructed in opposition to the laws of nature, and hence, we see little better than mere mimicry in them; the designer should aim at the production of characters that are known to conform to recognised laws, and then the appreciative mind will understand and admire them. But no one

understands the subject will admire the
ing of a huge piece of rock on its smallest
which, of necessity, requires backing up
supports to sustain it in its position, or
of the other of the many anomalies we
ften compelled to behold. In fact, good
is opposed to any violation of the laws
ture, and these alone should guide the
ner in his work. Let us, for the sake of
lustration, suppose that we are climbing
ne of those famous Welsh mountains
se huge masses of stones have been at
time since the Creation removed from
permanent bed, and hurled, as it were,
ome unknown force to a distance below.
t is the position of one of those rocks so
rbed? Does it stand perpendicularly
s smallest end as if poised by a process
onjuring? No; the force of its own
ht will, if there is nothing to impede its
se, cause it to rest on its largest end upon
arth, whenever the impetus under which
s set moving is exhausted. But if it
, as we suppose it does, upon the side of
untain, its angles are of necessity in pro-
on to the incline of the spot on which it
. In the position of one of these rocks,
ave the key to the whole art of rock-
making, and if we take it for a guide it
possible to err, because it is simply an
nent of natural laws of the class we are
ng to imitate. Unless we follow these
in the forming of conspicuous rocks, the
t must be an anomaly and an eyesore.
hose rocks that are to be partly covered
verhanging trees, or to be studded thickly
suitable rock plants, a trifling departure
these rules will not be perceived, nor
it be, perhaps, where a facing of rock is
ired, as sometimes it is desirable to face
ep cutting, or the front of a bank of
. Then a facing to imitate a rock may
rmed by a perpendicular construction or
t projection, but with rocks that are in-
ed for the chief features, no fancies or
eniences must be allowed to take a part
all events, in such a way as to be visible
e result.

s a concluding paragraph to this paper,
ould remind the reader that the rocks
must not be crowded together; they should be so placed as to appear to have a certain amount of connexion with each other, and different spaces devoted between them for single specimen trees or shrubs. The rocks, too, must be in proportion to the extent of the spot devoted to them. A huge rock, with only one or two other minor subjects for a small space, will be out of character, while, on the other hand, numbers of small rocks on a large space would look poor and insignificant. In every case, form the chief features of attraction first; give them bold distinctive outlines, and mark out the positions from which they can best be seen, before the connecting links are worked in, and all will end satisfactorily. It must not be forgotten that rocks alone will not finish the picture, for without some suitable rock plants they would look bare and unfinished. We must, therefore, in the course of construction, provide suitable places for them, and in such positions that they will best shew themselves without disturbing the character of the rocks on which they are placed.

What are usually termed pockets for this work, are the right things to form in the sides, and on the ledges of the rocks; but mere holes that will only hold a handful of soil are of no use whatever. The pockets should be made in size equal to the plants that are to be placed in them. Half a barrowful of soil each for large-growing ferns is not a bit too much, while for small creeping and climbing shrubs, such as the Cotoneasters and Honeysuckles, a pocket sufficient to hold a barrowful or more of soil will be only just enough to sustain the plants. It is no use to look at the immediate effect of such work as this; it is age that gives the finishing touch to all the best features, and they will be secured in exact proportion to the liberality of the designer in making a proper preparation for them.

I had hoped to have concluded the whole subject in this article, but the business o planting, and the selection of suitable plants, is of too much importance to be thrust in at the tail-end of this paper; so, for the present, the other notes must stand over.

NEW PLANTS.

HOLLYHOCKS.

Constance.—Pale flesh. First-class certificate. Chater.

Carus Chater.—Dark crimson. First-class certificate. Chater.

Walden Queen.—Pale rose. First-class certificate. Chater.

Junia.—Flesh-colour, tinted with blush. First-class certificate. Chater.

Leah.—Tinted yellow. First-class certificate. Chater.

LOBELIA.

Mauve Queen.—An effective bedding kind, with good sized bright lilac flowers; excellent in habit, and a free bloomer. First-class certificate. Appleby, Raleigh House.

PETUNIA.

Single Beauty.—A fine flower, with a pale lilac ground colour, the veins, radiating lines, and eye of purple. First-class certificate. Bell & Thorpe.

PICOTEES.

Admiration.—A fine rosy purple-edged flower, of good substance and quality. First-class certificate. Turner.

Miss Turner.—A small but charming flower, with a medium light rose edge, and of good substance. First-class certificate. Turner.

Prince of Orange.—A perpetual flowering sort of first-rate character. First-class certificate. Perkins.

PELARGONIUMS.

Admiration.—A finely finished flower, having pink lower petals, slightly blotched with rose; dark blotch on top petals, with broad margin of orange red, and outer edge of pink. First-class certificate. Turner.

Bonnie Charlie.—A dark painted flower, having rose lower petals, suffused with orange, and heavily painted with dark colour; top petals rich and glossy, narrowly edged with bright crimson; a free blooming fine sort. First-class certificate. Hoyle.

Corsair.—Brilliant deep rose lower petals, with large white throat; dark top petals, relieved by fiery orange, and edged with pale rose; flowers well proportioned and smooth; free blooming and excellent in habit. First-class certificate. Foster.

Gratulation.—Lower petals violet rose, slightly shaded with orange, and ornamented with a small dark blotch; top petals dark, the blotch on the upper side fiery and bright, surrounded by a narrow pink edge. First-class certificate. Hoyle.

Her Majesty.—Lower petals like those of Maid of Honour; but with less of salmon and more of lilac in them: the upper petals having a dense dark blotch, edged with carmine, shading off to pink at the extreme margin; flowers stout and bold; a decided advance. First-class certificate. Foster.

Holkar.—Lower petals rose, heavily suffused with pale purple, and stained with dark colour; top petals dark, edged with a narrow line of bright deep rose. First-class certificate. Hoyle.

Maid of Honour.—A large bold showy flower; lower petals salmon pink, centre large, white; small dark blotch on upper petals, with broad margin of salmon rose. First-class certificate. Foster.

Polly.—A somewhat novel dark flower, the lower petals rich crimson, heavily veined with dark; dark top petals, with a narrow edge of bright rose; dwarf in habit and free blooming. Second-class certificate. Turner.

Pretender.—A richly coloured and striking flower, but wanting the size and character of rose-coloured kinds; lower petals pale orange red, with a slight dark blotch on each; top petals dark, narrowly edged with bright crimson; a showy fine flower. First-class certificate. Foster.

Sultana.—Lower petals lilac, with small dark blotch on each; large white centre; top petals dark with a narrow edge of pink; striking, free blooming sort, which, moreover, possesses an excellent habit First-class certificate. Foster.

Warrior.—Lower petals dark orange carmine slightly pencilled with dark lines; irregular dark blotch on top petals, margined with fiery orange, and narrow rose edge; a fine showy variety. First-clas certificate. Foster.

Lady Carrington, Fancy.—Soft pink, with white throat and margin; a free flowering pretty sort for purposes of exhibition. First-class certificate Turner.

Leopard, Fancy.—Rosy carmine, suffused with violet; flowers large in size, smooth, and of fine substance. First-class certificate. Turner.

Marmion, Fancy.—Deep rose, shaded with dark throat white, with a slight edge of the same colour a good habited free blooming showy flower. First class certificate. Turner.

Harry George, Hybrid Nosegay.—A very fine variety, of excellent habit, with faintly zonal foliage and producing very large globular trusses of brigh orange rose-coloured flowers, the individual pip being of large size, stout, and circular; a promising sort for exhibition purposes. First-class certificate George Putney.

Gustave de Rothschild.—A dark pink bedding nosegay variety. First-class certificate. Firebuck.

Soleil.—A nosegay kind, with a fine truss of scarle flowers. First-class certificate. G. Smith.

Sydney Dunstan.—A nosegay, with an immense truss of dark magenta flowers, of good form. First-class certificate. George.

The Moor, Bronze and Gold.—A fine bedder, and very effective from its bright colour, which is clear yellowish green, with a dark chestnut zone. First-class certificate.

Plutus, Bronze and Gold.—Greener than the *Moor*, which it resembles, but it is not equal to it, though the zone is bright and effective. First-class certificate.

The Rev. W. F. Radclyffe, Bronze and Gold.—Remarkable for its free yet compact habit, and for endurance of colour, which is a bright yellow green, marked with a narrowly vandyked zone of clear chestnut red. First-class certificate.

Imperatrice Eugenie, Gold and Bronze.—A fine and distinctly marked variety, having a golden leaf-ground, and a broad, well-coloured, reddish, chocolate zone; a fine bedding variety. First-class certificate. Downie, Laird, & Laing.

Macbeth.—A very distinct golden tricolor. First-class certificate. Bell & Thorpe.

Amy Richards.—Variegated zonal of the Mrs Pollock style, remarkable for bold vigorous growth, and large, flat, highly coloured leaves, both growth and colouring being far superior to the older variety; a most effective bedder. First-class certificate.

Coleshill.—A bright scarlet zonal of fine form. First-class certificate. Eckford.

Sir R. Napier.—A very dark zoned variety, remarkable for its distinctness among variegated zonals. First-class certificate.

Claudius.—A large trussed zonal, in the style of *Amy Hogg.* First-class certificate. G. Smith.

Lord Stanley.—Dark zonal; flowers in immense globular trusses of the richest deep orange scarlet, remarkable for their brilliancy. Second-class certificate. F. & A. Smith.

Advancer.—A dwarf green-leaved free blooming sort, with pure self-coloured bright rosy pink flowers, and shewing every disposition to be a good bedder. First-class certificate. Bull.

Rose of Lee.—A vigorous, compact, and erect growing kind, with faintly zoned leaves and dense trusses of small flowers, elevated on long stout foot-stalks; colour bright rose pink, with white base to
petals. First-class certificate.

Bright Star.—A robust growing sil
variety, with leaves broadly edged with wh
ornamented with showy orange scarlet
First-class certificate. Turner.

Miss Kingsbury.—A most telling silve
gated variety, of dense compact habit, an
a broad white margin to the leaves, which
up to the average as regards flatness; flower
First-class certificate.

William Underwood.—A silver variega
growing sort, with dark zoned leaves, a
trusses of good sized, fair shaped, orang
flowers, of a very effective character. F
certificate.

Gem of the Season. — A very handsc
leaved kind, with large and abundant sal
blossoms, and remarkable for its variabl
which shew the lobed form of the ivy-leav
and are, some green, some with dark gr
others with pale green centres, and som
golden. One of the most valuable acquisitio
year. First-class certificate. Ford, Horsha

VERBENA.

Butterfly.—Colour warm, flesh ground,
showy crimson ring round a pale eye; a
and fine variety. First-class certificate. Pe

Rising Sun. — Ground colour glowing
red, with small white eye, encircled by a
maroon ring; pip and truss fine. First-c
ficate. Perry.

Thomas Hyatt.—Dark magenta. First-
tificate. Perry.

Joseph Saunders.—Beautiful scarlet. First-
tificate. Perry.

R. H. Vertegans.—Fine dark shaded purpl
class certificate. Perry.

Rev. J. Dix.—Pale flesh-coloured flowe
deep rose eye. First-class certificate. Perr

WHITE CLOVE.

The Bride.—Flowers large, and very f
the centre slightly tinged with sulphur; a fine
to these favourite flowers. First-class c
Turner.

The Stable.

ANTIQUITY OF HORSE-SHOEING.

ALL knowledge which has come down to us from the time the first records of horse-shoeing appeared, only serve to convince every candid inquirer that it is just sufficient to prove how limited that knowledge is, and that the early history of the art is hidden from us in remote ages.

The first books which give any detailed account of horse-shoeing were printed at Venice, soon after the art of printing got into full vogue—early in the sixteenth century. The authors of those works were Neapolitans, a people who, there is much evidence to shew, were in advance among Europeans in the art of horsemanship and farriery. But the works which were published at that period did not issue as original monographs, but in the form of compilations from traditional knowledge preserved in manuscript, and probably to as great an extent supplied by narration and usage. A remarkable feature of these writings, as we read them in plain modern Italian, is the absence of all semblance of newness of the matter treated on; but, on the contrary, shoeing is spoken of as a well-understood art. The various customs are referred to according to the usages in different countries, Turkey and Spain are in particular alluded to; and the more renowned practitioners of, or recently prior to the time the works were produced, are mentioned. Caracciolo, a writer of the beginning of the sixteenth century, though the revised edition of his book in my possession bears the later date of 1586, was one of the most extensive compilers. His work, "La Gloria del Cavallo," consists of ten sections, one of which is devoted to the economy of the foot and shoeing; and with such minuteness does he give instructions in the details of the process, that some of them might be exchanged for those propounded in our time, the more recent to be taken as those of an infant state of the art, and those three hundred years in type as conveying the riper knowledge.

We are in possession, however, of older data on the high repute of Italian farriery, than any derived from the books published by the Italians themselves. Berenger, quoting some Latin verses by Sir Thomas Chaloner, composed in the early part of the reign of Elizabeth, urging the requirement for improving the breeds of horses, in which occasion is taken by the ambassador to proclaim the praises of Henry VIII. for the attention which he paid to horses. Berenger mentions that Henry invited two Italian scholars of Pignatelli, a Neapolitan master of horsemanship of renown. And the king, we are told, likewise had an "Italian farrier, named Hannibal, who was looked u to by his English brethren as an oracle, an who did not discover great mysteries, but ye taught them more than they knew before."

This fact of the state of the art of farrier in Italy being in such repute at the period r ferred to, as to induce the king to engage th service of an expert hand—is most relevant t this inquiry. It gives us a glimpse of th latter end of the unwritten part of the histor of farriery, and brings us to the verge of th time when writers found the means of mult plying and diffusing the accumulated know ledge.

Towards the end of the sixteenth centur Carlo Ruini, a Bolognese senator, an student of the University of Padua, publishe his great work on the anatomy of th horse, and on the diseases incidental, wit instructions on shoeing. This work was of ferent kind to any that had prend which, for originality and range stands foremost among the writ- horse of all subsequent time.

ny aim to speak in praise of the work atest of anatomists of the horse of time, as more competent men in since it appeared have testified of its merit. I am not, however, ose who believe that such a work sprung up in an age, nor does its mpt to persuade his readers that To what extent Ruini found the ragments which, under his learn- improved into system, it is im- say. That work by Ruini was ma- same great school, and only a few r than that at which Harvey worked reatest of anatomical facts—the of the blood. And if it be just to our countryman the first place nan anatomists, leaving Cambridge to dispute the claims to their rela- n the education of the man, it is still ssign to Ruini the first place among anatomists of the horse, and the f modern veterinary science. But my subject—history of horse-shoe- ugh sensible of the indirect advan- such a work as the above must on the progress of a systematic of the art, I can discover no n his teaching above the precepts by the Neapolitan writers of an iod; but, on the contrary, the latter more rational and better guides. iarks, however, I must make with o conditions which, I can see, pre- The earlier writers had for their ne horses of Calabria, of strong, ofs, and feet altogether of ex- good form. While the learned was making his observations on reared in the districts of Ferrara and e low marshy valley of the Po— ses are exhibited with flat feet, dingly weak hoofs, and the diseases t which most prevailed and per- ini were such as defective con- predisposed the horses to. We cannot, with justice, blame that early writer, if to some extent his description of the form of the feet be exceptional; because he described what he saw, like an original investigator and faithful narrator, as he was. Following the great anatomist, in the succeeding century, we find the learned physiologist Borelli, who, by devoting his special resources to the elucidation of animal locomotion, fixed the knowledge of the action of the horse on physical data, which, though lost sight of in our day, was availed of by contemporaries and succeeding generations.

I shall now take leave of the Italian period with the above sketch. To Professor Ercolani, of Bologna, the veterinary world is indebted for the most exhaustive work extant on the history of veterinary writers, published at Turin, 1854, in two volumes. Readers wishing to pursue the inquiry will find the above work invaluable, and but for neglect of such searching after truth, works of the kind could not fail to be translated into our language. But, remarkable to state, with all Professor Ercolani's learning, and indefatigable researches into the works of all countries, from those of Greece, Arabia, and Rome, down to very recent dates, yet no clue is found to the origin of shoeing, or its infant stage of development.

Thus far we have glanced at the history of horse-shoeing over three periods, say, the indefinite, from early times not recorded; the Italian period, as we find the art when the printed records and instructions appeared; and, thirdly, the second Italian period, when literature and the arts and sciences flourished, and Ruini appeared as the pioneer of the time.

Now I must trace on my subject westward. There is no reason to believe that men were inactive on this side the Alps in the furtherance of improvements in farriery, any more than in other departments of industry; but all reports concur in pointing to the Italian Peninsula as the place where thought and action were most concentrated and available for improvement.

Accordingly, we find Solleysel, after the example of Harvey, going to Italy to gather knowledge of all kinds bearing on the cultivation, management, &c., of horses. Nor was France less fortunate than England in the choice or accident of the man on whom devolved the honour of doing so much good.

Solleysel, a native of France, lived from 1617 to 1680, was bred to the art of horsemanship, a calling which, formerly more than in our time, seems to have attracted men of education. Numerous examples of distinguished men of birth could be given to illustrate this proposition, but of Solleysel we learn little until the period when, from his own account, we find him in Italy, gathering from all available sources, neither undervaluing science or the simplest rules of art. Though ostensibly a riding-master—and we find him filling that post, as one of his offices, to Louis XIV.—it does not appear that he pursued that branch much in Italy, where he was always intent in storing his mind with such knowledge as he derived from the learned anatomists and practitioners of the art of farriery. Solleysel's work, "The Perfect Farrier," published in 1664, is the best testimony that can be adduced of the author's intellectual powers and perseverance, no less than for the candour of his acknowledgments to his Italian masters, and clearness of detail. Some of Solleysel's biographers tell us that he went to Germany to study his art; but if he did so, it must have been on horsemanship chiefly, because in his own writings he makes no mention of having pursued that course, while his allusions to Germany and the Low Countries in reference to their horse-producing capabilities, supports the statement that besides going to Italy in search of knowledge, he had also profited specially by the resources he found nearer to France.

Solleysel's character and the merits of his [illegible] work, as is the case with all great men [illegible] their works, have been differently estimated [illegible] different critics; the general result being high praise. The estimate of his followers in [illegible]lling, of his own country, and the more able [illegible] generations of those abroad, appreciated the [illegible] the author [illegible] as their own course agreed with his example and precepts, neither despising science nor art, but making one the helpmate of the other. Some of the Italian writers have thrown out remarks, that much that Solleysel professed was of Italian origin, and therefore the merit should be awarded to whom due. I submit that not only was justice done by generous and general acknowledgments in that respect, but that the greater honour was due, for the good conferred on the veterinary art of the future, by his gathering up facts and doctrines, and elaborating the whole into more extended usefulness, in the position he acquired in his own country. Other critics allude to Solleysel's teaching with depreciation, because they find that he retained much of the old, by some called inert, by others barbarous, rules of practice; these help to establish what I believe was a leading feature of Solleysel's character, viz., that he was at once the greatest promoter of the progress of farriery, and the most conservative of all that he found of old customs, until something better was discovered.

Solleysel exerted more influence on the improvement of the art of horse-shoeing than any other man on record down to his time; and yet it does not appear, either from his own writings, or those of others, that he extemporised any new plans, while it is abundantly shewn that there were able shoers in France at the time, among the master farriers who offered opposition to the new ideas and practical details propounded by the then superintendent of the horses of the Court. Solleysel found, among professional antagonists, men worthy of hi talents, and it was, I believe, by his advanced knowledge of the anatomy of the horse and in particular of action, which he ha acquired under the Ruini and Borelli school that exerted a permanently good influenc on the teaching which followed from the stud of, and reference to, his works.

From the latter half of the seventeenth to the middle of the eighteenth century there was no occurrence, or appearance o men, that have left any mark on the in relation to this subject to notice. While improvement was everywhere in Europe, in this as well branches of knowledge, systematic eing was becoming a reality in rom one confine of the nation to the The chartered body of farriers (*Marechaux*) was influential for good, and all progress harmonised towards raising the superstructure on the common basis, which became accomplished, the result being the Veterinary Colleges, the inauguration and further progress of which must form the subject of another communication.

CLIPPING CATTLE AND FARM HORSES.

ER this heading, an article appeared in the last number of the *Gentleman's Magazine*, entitled "Clip- tle and Farm Horses," purporting it forth to the agricultural world by a farmer from France, in which the narrative occurs :—

> the year 1851 I caused a dozen to be clipped, and put up to fatten th others of the same age and breed, ooner were they shorn of their coats began to increase in weight far more han the unclipped cattle, which had 1 and otherwise treated alike. In er 1852, I recommenced the experi- The clipped cattle ate their rations is period with much greater avidity unclipped; indeed, their provender red so much faster that one would agined the food had not been listributed.
>
> experience in clipping has not, how- n confined to fattening beasts, but also to working oxen and farm horses. a dozen of the latter to be clipped, comparing their condition and work- rs with the rest, had the satisfaction ving that the operation had been with the same results as in the case llocks."

e writer's report of results and de- nust refer the reader to the published ons of his paper. And now my own his matter begins. I have exposed the awkward position, through being to exclaim against the custom of clip- rses, of standing as the supporter opposed to doctrines such as the writer aims to establish. So opposed, h ever, are the results of my experience to those of this French writer, whose scheme is brought suddenly before us—though eighteen years have elapsed since the first of the reputed trials were made—that I cannot give up all that observation and work have enabled me to establish, over a much longer period, at the mere bidding of a sensational article.

And yet, it is quite clear that one of us must be wrong, and if I am in error, the sooner the proof is brought out the better. In this French translation, published in the *Field*, and now in *The Country Gentleman's Magazine*, the writer says :—" After a few weeks further trial of the experiment I decided to have all my horses clipt." On my own part, I lack some such data as the writer argues from. I have not experimented on animals so valuable as bullocks and horses by dozens; but, on the other hand, I remember when no horse was ever known to have been clipped, and, save some trimming adopted by postmasters and other horse owners in this country, and a somewhat similar practice followed by the muleteers of Italy and Spain, nothing of the kind was heard of. The only animals ever seen shorn then were sheep and geese, both under strict attention and exigent conditions, viz., that the wool and the feathers could only be taken in midsummer, with provision against unpropitious weather. To have done otherwise were to commit similar destructive havoc to that of taking the honey from the hive regardless of the bees; the loss of the stock results. Experience shews that the laws of health, humanity, and economy, are violated by the clipping process.

But words alone cannot settle such questions as the above, especially when a writer in France, where these scientific subjects have usually been conducted with care, and often with good results, finds mediums in England and Scotland for his views, established, it is stated, from a series of experiments extending from 1851. I therefore see no way of meeting the statements made but by recourse to other experiments.

It may be provoking to be put to the trouble and expense of clipping several head of cattle, and placing them in stalls by the side of others of like condition, and conducting the whole under observation. This involves trouble, but it should be undertaken rather than let a false theory take root and engender bad practice. If, on the other hand, any part of what the writer adduces as established fact, be found to be such, the result will repay the inquiry.

Not every man can trust himself, or should be relied on, to conduct experiments, because sources of fallacy are always numerous, and, besides, it too often happens that men draw their conclusions first, and then manage to make every experiment tally with their preconceived notions.

If gentlemen like Messrs Gilbert and Laws, the renowned cattle breeder and feeder of Aberdeenshire, Mr Mechi, and some others from among stock proprietors, will turn their attention to the subject, this question can be settled in three months, and a great deal brought out, probably more than expecte at the same time.

I would then not only keep and feed th bullocks both alike and together, but trea them the same as the other cattle in th byres. And in addition to weighing thei food, the water they drink should be measured and further, and preliminary to the whol process, I would arrange their stalls so tha their urine could be collected, for the purpos of ascertaining quantity and properties, o that of the two animals respectively, at any given time required for analysis.

I do not expect that any very remarkable phenomena would occur in the prosecution of these observations, on cattle clipped at the time of being put up to fatten. No animals could be in more favourable conditions to bea the ordeal, well fed and well housed. Still, accurate observations will reveal a difference. One item of evidence of truthfulness in the report of these experiments, is the statement that "the clipped cattle eat their rations with greater avidity than the unclipped." Now, this agrees with all that experience and study of the laws of the animal economy teach us. That the clipped animal requires more food than the unclipped, because the heat of the body, instead of being retained by the coat, is carried off and wasted, and the whole system is taxed for the elaboration of increase of heat-supporting material, for which food, that should go to form flesh, is consumed, to support warmth and vital energy. In similar relative degree, cart-horses, if well fed and steadily worked, would suffer less than other classes of horses differently managed.

The Dairy and Poultry-Yard.

PRACTICAL NOTES ON WINTER DAIRYING.

THE rapid approach of the rigorous weather of winter warns the prudent dairyman to consider the best means of keeping up the produce, and not only the produce, but the health—for on the one depends the other—of his dairy cows. In the neighbourhood of large towns, or to which there is a ready railway conveyance, there can be no doubt of the remunerative nature of dairying. With a fair amount of skill in the choice of his animals, the dairyman can always calculate, with some degree of certainty, the probable profits which they may realise to him, as, with a good supply—which the choice of his stock pre-supposes and secures—he can always rely upon the price, or rather the cash, he receives for the milk being steadily maintained through regular periods of the year. In the choosing of his stock, the dairy farmer will require to consider the principle upon which he is to treat them. He may either decide upon that mode of feeding, which, while keeping up the supply of milk, will also keep the animals in such condition, that when the flow of their milk is reduced below the paying point he can sell them off at once in good condition for the butcher, or he may feed the cows in such a way that the chief result will be the keeping up of a good flow of milk, not so much in the direction of keeping up their flesh, so that the animals may be turned out to grass in the spring, and take their places as part of the stock of the farm. In the latter case, the animals which may calve at the latter part of this year, if judiciously fed up to the grass period in the spring of next year, may be as valuable as dairy cows as if they had entered at that period. Much will of course depend upon the age of the cow; for it should not be forgot, that so far as her feeding or fattening properties are concerned, an old cow cannot be expected to reimburse the cost of her keep, and, in addition, yield a profit, so readily as a younger animal. Old cows, therefore, cannot be milked and fattened so economically as young cows judiciously chosen as to age and points. A great deal also depends upon the kind of food employed for the cows. Food calculated to give a great flow of milk, as sloppy food, and the like, will not keep up the condition of the animal alone. Richer food will require, therefore, to be added; and it is doubtful whether, in view of the many artificial foods now put forward as being specially adapted for milk cows, any is so good, in the long run, as oil cake; and of oil cake, that of rape we unhesitatingly put at the top of the scale. The great point to be aimed at is to keep the cows in good condition, never allowing them to go back, for, once this is done, scarcely any amount of care will suffice to restore them to the original good condition which characterised them. When cows are purchased near, or at the period of calving, it is essential to see that they are then in good condition. This being secured, it will be much more easy work to keep them so than if bought when yielding full milk.

Once the cow has calved, and she keeps free from the maladies to which she is liable at this critical period, every care should be taken, by attention to her health and diet, to keep up her good condition—a difficult matter with some animals who cannot well stand the drain upon them, in consequence of their yielding a full supply of milk. The end of the year is a capital time for cows to calve, as the calves can be got forward in time to be put to grass in the spring, and thus be kept constantly and steadily progressing. Taking all things into account, it is the easiest way, and gives the most immediate results, to sell the milk off the farm, if the locality of the same suits this mode. This mode, however, reduces the dairy farmer in the feeding of his *calves*, either to giving them the milk which he would otherwise sell—as skim milk is not available—or, if grudging the milk, which is likely to be the case, to use other foods. What these foods for calves, in such circumstances, are, or should be, we purpose in this series of papers to point out.

NOTES ON DAIRY MANAGEMENT.

RULES FOR DELIVERY OF MILK.

THE following are the rules adopted by the Milk Condensing Factory at Elgin, Illinois :—

1. The milk shall be drawn from the cow in the most cleanly manner and strained through wire cloth strainers.

2. The milk must be thoroughly cooled immediately after it is drawn from the cow, by placing the can in which it is contained in a tub or vat of cold water, deep enough to come up to the height of milk in the can, containing at least three times as much water as the milk to be cooled; the milk to be occasionally stirred until the animal heat is expelled, as below.

3. In summer, or in the spring and fall, when the weather is warm, the bath shall be spring water, not over fifty-two degrees temperature (a day or a night after a heavy rain excepted), constantly running or pouring in at the bottom, necessary to reduce the temperature of the milk within forty-five minutes to below fifty-eight degrees; and if night's milk, to remain in such bath until the time of bringing it to the factory, and to below fifty-five degrees. The morning's milk not to exceed sixty degrees when brought to the factory.

4. In the winter, or in freezing weather, the bath shall be kept at the coolest point (it need not be running spring water) by the addition of ice or snow sufficient to reduce the temperature of night's milk speedily below 50 degrees.

5. In spring and fall weather, a medium course will be pursued, so that night's milk shall be cooled within an hour below 50 degrees; and morning's milk below 55 degrees.

6. The bath and supply of water shall be so arranged as to let the water flow over the top to carry off the warm water. The can in which milk is cooled shall be placed in the water immediately after the milking, and shall remain there until [illegible] cooling shal[illegible]

7. The [illegible] ately cooled [illegible]

8. No milk shall [illegible] received [illegible] subsequent [illegible]

9. The milk shall be delivered on the platform, at the factory in Elgin, every day except Sunday.

10. Suitable cans of proper dimensions, to transport the milk from the dairy to the milk works shall be furnished by the seller, and the cans shall be brought full.

11. The Company shall steam and clean the cans at the factory, free of charge, but customers shall keep the outside clean. The pails and strainers employed shall be by the seller thoroughly cleaned, scalded in boiling water, and dried morning and night.

12. Immediately before the milk is placed in the cans, they shall be thoroughly rinsed with clean water; and great care shall be taken to keep the cans and milk free from dirt or impurities of any kind. When the cans are not in use, they shall be turned down o a rack, with the tops off.

13. All the "strippings," as well as the first pa of the milk, shall be brought. No milk will be re ceived from a cow which has not calved at leas twelve days, unless by consent of superintendent o agent who may determine its fitness sooner by sample of the milk.

14. The cows are not to be fed on turnips or oth food which would impart a disagreeable flavour to th milk, or upon any food which will not produce mi of standard richness.

15. It is further understood and agreed by th parties hereto, that if the superintendent or agent the company shall have good reason to suspect, eith from evidence furnished or from the state of the mi itself, that water has been added, or that it has not be cooled as provided, or that it has been injured by ca lessness, he shall have a right to refuse to receive su milk, or any further quantity of milk, from the pers so violating these directions and stipulations.

HOW MUCH BUTTER AND MILK WILL A COW GIV

In the *Agricultural Gazette* for February 8, 18 correspondent gives his experience of da farming. He says, "I consider 720 gallons (28 quarts) a fair return in a year for a cow, and th quantity of milk, if the food do not contain more th

80 per cent. of moisture, will produce from 280 to 290 lb. of butter." This same writer says, that 25¾ lb. of milk, or about 10 quarts, will make 1 lb. of butter. He also states that 5 gallons, or 20 quarts, was the highest daily yield of one cow. He was evidently a practical man, for he actually kept 48 cows. He states that 47 cows actually gave throughout the year an average of 84 gallons daily, or 84 × 365 = 30,660 gallons, or 122,640 quarts in one year, from 47 cows, or 2610 quarts from one cow; and if 10 quarts produced 1 lb. of butter, that would be 261 lb. of butter yearly from each cow, as the average from forty-seven cows in one year. Again, in the *Farmer's Almanac*, for 1868, I find it stated that a Holderness cow gave 29 quarts daily, yielding 1 lb. of butter from each 12 quarts. An Ayrshire cow gave 20 quarts daily, yielding 1 lb. of butter from 9½ quarts; an Alderney cow gave 19 quarts, yielding 1 lb. of butter from 12 quarts; and a Devon cow gave 17 quarts, yielding 1 lb. of butter from 9¾ quarts. Of course these last are exceptional cases, but your own correspondent gave his actual experience of one year of a dairy of forty-seven cows. Now I reckoned on 3000 quarts, but I allowed 12 quarts to produce 1 lb. of butter, which gave 250 lb. in a year, instead of 261. I do not think that I have greatly over-estimated the produce of a cow. Moreover, in Dorsetshire, it is by no means uncommon for a farmer to let out his dairy to a dairyman at £15 and even £18 per cow per annum, and that dairyman makes a profit out of it.

CHEESE MAKING IN FACTORIES.

At Alfreton, Mr Nuttall referred to the making of cheese according to the American plan in factories. The occupiers of dairy farms found increasing difficulty in making the rent. The price of their cheese appeared to be declining, and the cheese factors said that every year they got an increased quantity of cheese of middling quality. That applied chiefly to the large dairies. The smaller dairies were, in some cases, superintended by the farmer's wife or by his daughters, and a satisfactory result could be obtained; but it was scarcely reasonable to expect, especially under the improved system of education that existed, that the wife or the daughters of farmers possessed of considerable capital should undertake the severe toil and drudgery involved in the personal superintendence of cheesemaking. The result was, that the owner of thirty, forty, or fifty milking cows depended for the means of making his rent on one woman. If anything happened to any of theother servants they could replace them; but if from any cause they should be deprived of the services of the dairymaid in the middle of the summer, where were they? A few years ago, American cheese fetched a low price, whilst it was now sold at 1d. a pound above any produced in Derbyshire. Were they to be content with that? The only way to meet the difficulty was to adopt the American plan. They were discussing the question at Derby, and had some private meetings. Mr Jenkins, the Secretary of the Royal Agricultural Society, had been down to make inquiries; and there were men ready with the capital to put up a cheese factory near Derby, if they could ensure a supply of milk, at a price which would pay them, within a reasonable distance. He hoped they would soon be in a position to carry out the system in South Derbyshire. All milk received into the factory would be tested as to its value. If a farmer fed his cattle with grains and other food to increase the quantity of his milk, but with the sacrifice of quality, he would be put at a lower rate; if the quality was above the average, the price would be raised in proportion. In case of water being mixed with the milk, the manager of the factory would decline to deal with the person pursuing the system at any price.

VALUABLE RULES FOR POULTRY MANAGEMENT.

The following are some rules that it would be well to observe in rearing chickens:—1. Keep the chicks in a warm, clean, dry coop. 2. Don't let them run out in the morning until the sun has removed the dew from the grass. 3. Let them have plenty of food and fresh water. 4. The coop must be ratproof. 5. Don't let the chicks have access to slops or stagnant water. 6. See that they are housed when a storm is threatening.

Rules for keeping the henery in proper order:—1. Clean out every day, and sprinkle a handful of lime. 2. Sprinkle ashes over the floor two or three times a week. 3. Frequently change the straw or hay forming the nests, and whitewash the nest boxes at every renewal, and twice a year thoroughly whitewash the whole interior of the house.

Rules for the management of setting hens:—1. Set the hen in a place where she will not be disturbed. 2. Give a large hen twelve or thirteen eggs, a medium sized one ten or eleven, a small one eight or nine. 3. Don't let the hen come out of the setting room until she has hatched, but keep her supplied with gravel, food, and water. 4. When the chicks are hatched, leave them in the nest for eight or ten hours. 5. Don't meddle with the eggs during iucubation; turning them once a-day, and all such foolishness, is apt to prevent the eggs from hatching.—*Cor. Rural New Yorker.*

RAISING TURKEYS.

Many have alleged that the turkey sits thirty-one days. This is an error. The chicks break the shell from the twenty-sixth to the twenty-ninth day, scarcely ever later. The day but one before the hatching is expected, the hen should be plentifully fed, the nest cleaned of any dung or feathers during her absence, and an ample supply of food and water placed where she can reach it, as she *must not again be disturbed* till the chicks are out. In dry weather, if the nest be in a dry place, the eggs will have been daily sprinkled. With these precautions, there will rarely fail to be a good hatch.

The egg-shells may be cleared away after hatching has proceeded some hours; but the chicks should *never be taken away from the hen*, and never be *forced to eat*. The latter practice is very general, as turkey chicks are very stupid, and do not seem to know how to peck. But a much better plan is to put two ordinary hen's eggs under the turkey, five or six days after she begins to sit, which will then hatch about the same time as her own, and the little chickens will teach the young turkeys, quite soon enough, what they should do. Water or milk may be given, however, by dipping the tips of the finger or a camel-hair pencil in the fluid, and applying it to the end of their beaks.

The usual feeding is oatmeal and bread-crumbs, mixed with boiled nettles. Such food is not good, as turkey chickens for a few weeks have a great tendency to diarrhœa, which the oatmeal rather increases, and the result is a weakening of the system, and frequently many deaths. The very best feeding at first—say for a week—is hard boiled eggs, chopped small, mixed with *nothing* but minced dandelion. With regard to the choice of this herb, Mr Trotter, who was the first to *study* turkey treatment rationally, and after him many others, have observed that, when at liberty, the young birds invariably choose the dandelion before all other green food, and it probably serves to keep the bowels in proper order. When dandelions cannot be obtained, and it is well worth while to *grow* them where turkeys are reared, boiled nettles chopped fine are perhaps the best substitute.

At the end of a week or ten days some bread-crumbs and barley-meal may gradually be added to the egg, which may be by degrees lessened, until quite discontinued at the end of three weeks. About this time, a portion of boiled potato forms an excellent addition to the food, and by degrees some small grain may be added—in fact, assimilating the diet very much to that of other poultry. Curds, also, are excellent as a portion of the dietary, but must be squeezed very dry before they are given. They are easiest prepared by adding a pinch of alum to a quart of milk slightly warmed.

By this feeding, the little chicks will get well through their first great danger—the tendency to diarrhœa already alluded to, and the cost of the egg will be repaid by the extra number reared.

The second peril to be guarded against is cold and damp; a wetting is absolutely fatal. The chicks should be kept entirely under the shed, on a board floor kept scrupulously clean, and nicely sanded, except during settled, sunny weather, when they may be allowed a little liberty on the grass, after the dew is quite dry; but in cold or windy weather, however fine, they must be kept in the shed, and well screened from the wind. If there be a one-storey building, their best place will be on the top floor, the bottom being devoted to the sitting hens, and other adult stock. Their water, also, must be so supplied that they cannot wet themselves by any possibility; and these precautions must be continued till they are nine or ten weeks old, when they will begin to "put on the red," as it is called, or to develop the singular red excrescences on the neck, so characteristic of the turkey breed. This process will last some little time, and when completed, the birds will be pretty fully fledged. They are now hardy, but must not be too suddenly exposed to rain or cold winds. Take some reasonable care of them for a while longer, and very soon they will have become the hardiest birds in the poultry-yard, braving with impunity the fiercest storms, and even preferring, if permitted, to roost on high trees through the depth of winter. In fact, turkeys will rarely roost in a fowl-house, and a very high open shed should therefore be provided, the higher the better, the perches being placed as high as possible. They might be left to their natural inclination with perfect safety, so far as their general health is concerned; but in very severe weather, their feet, if roosting on exposed trees, are apt to become frost-bitten.—*Practical Poultry Keeper.*

The Naturalist.

THE FEATHERED FRIENDS AND INSECT ENEMIES OF THE FARMER.

The following Notes—in themselves far from complete—regarding existing relations between Farmers' feathered friends and insect enemies, may (should further observations on the subject be contributed by our readers), from the foundation of an instructive collection of facts, from which, when thoroughly established and systematised, some profitable results may be realised.—Ed.]

HAWKS, though injurious on account of their destroying insectivorous birds, do sometimes atone, in some measure, for the mischief they do by feeding upon insects. A Sparrow Hawk shot in the autumn, was found, on dissection, to be filled with grasshoppers; while a Falcon contained these and beetles. Nevertheless, upon the whole, Hawks may be classed as decidedly injurious to the Farmer. Their destruction, however, by gamekeepers materially diminishes both the good and evil done by them.

Owls feed chiefly on rats, mice, and moles, and sometimes also on beetles. With the exception of the White Owl, they, however, also kill small birds, some of which are Farmers' friends.

Woodpeckers are in general very beneficial to the Farmer, on accoun of their destroying larvæ of wood-boring insects. The stomach of one of these birds, that had been shot, was found to be filled with ants. The perforations which they make in the bark of trees are made for the purpose of finding insect food; and even fruit trees thus operated on are not thereby at all injured. Although pieces of bark and young wood are frequently found in the stomachs of Woodpeckers, they tap on the loose bark; but even in sound wood, it is surprising what holes they can bore. They, however, frequent meadows as well as trees in search of insects and grubs.

Swallows catch moths on the wing, and feed on soft-bodied insects, such as gnats, that they also find in the air.

Robins are very good friends to the Farmer. True, they devour small fruits; but it should be remembered that during the rest of the year they are busily engaged in destroying larvæ and insects, which would otherwise be injurious to crops. A Robin, shot in spring, contained spiders, larvæ of other insects, and morsels of wild plants.

Both *Blackbirds* and *Thrushes* are exceedingly useful, especially the former. Thrushes are to a greater extent woodland birds. Both destroy myriads of larvæ and full-grown insects, which would otherwise multiply and increase to the great injury of vegetation. They are, however, as most cultivators know, extremely fond of what are termed "soft fruits," which even nets can scarcely keep secure from their depredations. On this account numbers of them are shot, and are otherwise destroyed. They are, however friends rather than enemies.

The *Blue Titmouse* is a useful bird on account of its destroying the eggs of minute larvæ. One of these birds, shot during severe weather, was, however, found to be full of small larvæ and insects which live or hybernate in the crevices of the bark of trees.

To *Finches*, Nurserymen are in general no friends. They live upon seeds, both green and ripe, a fault which is not counterbalanced by a corresponding amount of good in any other direction. They are very injurious to the expanding buds of young trees in spring. On shooting one at that season its stomach was found to be completely filled with buds; and on examining a branch on which it was at work, it was observed that at least two-thirds of its buds were destroyed. There can be no doubt, therefore, that Bullfinches are the cause of much injury to fruit crops. Some say, that in summer, their principal food is insects and berries; while in winter, the only good done by them is eating dock and nettle seed. The beak of the Hawfinch shews him to be capable of doing mischief to buds and young shoots. He has also a great love for green peas.

As regards *Sparrows*, some contend that they are much more injurious than beneficial, and have caused them to be killed by means of gun and strychnine. In regard to these birds and *Rooks*, a popular writer has said, "were it not for the birds that frequent our gardens and nursery grounds, and insects which prey upon each other, the number of these diminutive creatures produced, would be such as to overpower the industry of man." It has been computed, that a pair of Sparrows carried to their young in one week no fewer than 3360 caterpillars; at which rate, in the course of three months, this family would consume 43,000,680 caterpillars! Let any one calculate the damage that these caterpillars, and the infinite progeny that must have issued from them, would have done in that period, had they been permitted to get into their winged state, and he will then see reason to doubt how far we do wisely to exterminate these birds, because of the tasting they take of grain and fruit when they come to maturity. It has often been remarked that, after an extensive rookery has been eradicated, on account of the damage which it did to the corn-fields in the neighbourhood, these fields, both of corn and grass, have been so infested by grubs, as to yield crops much inferior to those which had been reaped from them while the Rooks were there; for it is well known that these birds are so fond of grubs as to prefer them to every other kind of food, and are, therefore, in perpetual search for them, picking them up and devouring them in immense quantities.

The farmer's complaint in regard to Sparrows (and in which there seems to be some truth) is, that they seldom leave the farm-yard, except when ripening corn invites them to the fields, and that after harvest they return to the stack.yard. Therefore, say they, "what good do they effect in the fields in the way of catching grubs or insects." Gardeners encourage Sparrows; but still they admit that they must be kept within certain bounds as regards numbers.

Those who grow clover for seed should keep a sharp look out for *Wood Pigeons*, which are very destructive to it in spring; while in summer, strawberry crops, unprotected, receive considerable damage from them. In short, most cultivators agree, that, as regards the good they do, they are not worth their "grub."

The little *Hedge Sparrow* and *Common Wren*, are staunch farmers' friends, being both very harmless and true insect devouring birds.

Starlings also live upon grubs and insects or their larvæ, "all the year round," and nothing hurtful to vegetation has, as far as can be remembered, ever been laid to their charge.

Of that "sweet messenger of spring," too, the *Cuckoo*, much may be said in terms o praise. In Surrey, and Hampshire especially Cuckoos are very plentiful, and do muc good, particularly in keeping down caterpillars on currant and gooseberry bushes while to the farmer they are scarcely les dutiful servants. Few would think of injurin them; but those, who would, should recollec the many claims they have for protection.

In conclusion, it may be added, tha M. Florent Prevost, who collected an examined the stomachs of European bird for several years, arrives at the result tha from his researches "birds are in general fa more useful than hurtful to the cultivato and that the mischief done at certain period by graminiverous species is largely compensated by the destruction of insects which the effect at other times.

The Country Gentlewoman.

'S ON HOUSE MANAGEMENT AND DOMESTIC ECONOMY.

**wing is the first of a series of papers written by an experienced farmer's wife for the information of a young
who was about to take upon herself matrimonial duties as the head of a farmer's household. Our readers
perceive that the necessities of a limited income inspired the writer, and that "her own experience in
wn house" alone furnish the materials for the papers, the first of which is now printed.]**

EAR GRACE,—As you are pleased to
what you term our household *regime*,
sh for a few hints on the same, I pro-
send you, as occasion offers, a series
rs bearing on house management and
ic economy generally. But, as you
was singularly ignorant of practical
when I married, and have only gained
owledge by hard-earned experience,
ite out of the usual paths, here a little
re a little, picked up in the most de-
way, you will not be surprised if my
tion comes to you in the same fashion,
all write on whatever topic happens to
ermost at the time, and leave you to
from among the spoil the facts that
best.

first, concerning dinners. I cannot
ber the particular courses we had when
ere with us, but as we vary the table
very slightly, except on formal occa-
I will give you a general notion of our
operandi.

gin with Sunday, as that being the only
y husband can dine at home. We
en the joint that is to form the *piece*
tance for the week, and in the careful
n of it lies much of my success in
ical dinners. I nearly always choose
of the sirloin with the under or Eng-
e. This is carefully and slowly roasted,
ell basted, and sent to table thoroughly
, but very juicy, from the constant care
ed on the basting. Potatoes, snowy
prepared in the English fashion, by
ng, and a dish of carrots, *a la Francaise*,
te our first course.

I give you the receipt in detail for the latter. After well washing and scraping three or four large-sized carrots, cut them as for broth, and put them in a saucepan with water sufficient to cover them, and a bit of dripping or butter, the size of half a walnut. Boil them till tender, and the water is nearly absorbed, then add a breakfast-cupful of milk, a small bit of butter, a seasoning of pepper and salt, thickening the milk with a teaspoonful of corn-flour. On adding the milk as above, draw the saucepan to the side, if the fire should be too brisk, and continue stirring till it boils, when it may simmer till wanted. This forms a most excellent dish, either with or without meat, and during winter, when choice vegetables are scarce, is invaluable. For pudding, a shape of Brown & Polson's corn-flour, made with two eggs, and eaten with any kind of jam. I make a point of having dessert on Sunday, however simple—a few table-raisins or nuts, apples, pears, or oranges, and always a plate of biscuits for the little folks, who, dining at their usual time in the middle of the day, are allowed to come in for the pudding course at our four o'clock dinner, as you know they never get fruit, save when cooked.

I will admit that the dinner I have described would not suit a gourmand, but it accords very well with our income, and we desire nothing better.

On Monday, the under side of the roast, purposely left when hot, is cut in thin slices and warmed for breakfast, with a little of the gravy. At dinner time, a slice or two is minced fine and warmed up with gravy beef-tea, from Liebig's essence, for the children. A baked bread pudding, without eggs; they also share with myself and the servants, the cold meat and any carrots, warmed up, from the previous day, serving as our first course. On Tuesday, again, the roast beef does duty for us all, two servants, two children, and self, while it also serves for breakfast. But I must advise you always to superintend, at least, the proper eking out of Wednesday and Thursday dinners. A servant, however "knacky," and inclined to make the most of everything, is not so careful at seasoning and in duly proportioning each ingredient, as her mistress ought to be; and it is not reasonable to expect too much from the very useful help known as the general servant. I see, first, that every bit of meat is removed from the bones, then finely minced and put in a basin, to which is added a handful or two of bread crumbs, chopped parsley, and onion parboiled, a beat up egg, a small pinch of cinnamon or allspice, a teaspoonful of vinegar, two teaspoonfuls of ketchup, and pepper and salt. These are well mixed and formed into cakes about 3 inches in diameter, and an inch thick, and fried a nice brown in some of the beef dripping. I sometimes bake the minced-meat, for a change, in an enamelled tin pie dish, or make a light paste and enclose it like fruit puffs, frying them the same as the rissoles; but in each case a little made gravy or sauce is sent to table with them.

Besides our plain puddings, we have daily a second vegetable, such as a cabbage well boiled, thoroughly drained from the water, seasoned with salt and pepper, and fried with a little dripping, after being floured well from the dredging box; or we have a Portugal onion simmered for three hours, with a very little water, then a teacupful of milk added to the liquor, a morsel of butter, pepper and salt, and thickened with corn flour. These imple additions, costing little beyond time and trouble, explain why a roast of from 8 to 9 lb. may be made to serve the number I have named over five days. Our puddings are of the plainest kind—tapioca simmered for three hours with good skim milk; then turned into a buttered pie-dish and baked. Sago treated in the same way, or baked rice, barley, or bread puddings, prepared, as a rule, without eggs, and occasionally, as a variorum for the children, eaten with golden syrup.

This, our roast beef week, we generally end with good Scotch broth. The beef bones boiled well, the soup carefully strained over night, skimmed in the morning and put on with small cut carrot and turnip, parsley, barley, pepper and salt; and, when easily procurable, a cauliflower or young cabbage-lettuce. With a broiled mutton chop, this forms an excellent dinner, and does not require to be supplemented by a pudding.

Not to weary you with further dinners at present, I shall close my paper with a few general hints on kitchen surveillance. First, I would advise that you pay at least two daily visits to the kitchen and scullery. There is a way of prying into small matters that is very offensive to servants, which I do not advocate, but there is also a way of seeing things without appearing to seek them out, and allowing your servant to learn, that, though you are not bent on fault-finding, there is little that escapes your notice. If you can impress on your servants the value of cinders as a backing to a parlour or nursery fire, carefully store the left bread for puddings, draw up the Venetian blinds straight, and take care of the knife-handles, then, I say you are a happy woman, and your servant is chief among Deborahs; but I think your experience will have led you to be very moderate in your expectations of such perfection, and taught you that patience is a cardinal virtue, acquired most readily in the training of a maid-of-all-work.

As to the saving of dripping, I have found that my maidens are pleased to gratify me in this particular, as they learn to prepare and cook a variety of dishes I would not attempt had I to substitute butter for it; and this, of course, from motives of economy.—*Marjory.*

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